From Rick_Whiting@ATK.COM Mon Oct 10 14:43:41 1994
Return-Path: <Rick_Whiting@ATK.COM>
Received: from ATK.COM by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0quQcz-0000mBC; Mon, 10 Oct 94 14:43 CDT
Received: from gateway1.ATK.COM by ATK.COM (5.65/1.34)
     id AA06809; Mon, 10 Oct 94 14:43:12 -0500
Message-Id: <9410101943.AA06809@ATK.COM>
Date: 10 Oct 1994 14:51:40 -0600
From: "Rick Whiting" <Rick_Whiting@ATK.COM>
Subject: HF Digital Bibliography
To: "Post hfsig TAPR" <hfsig@tapr.org>
Cc: Bob_Hunter@gateway1.ATK.COM, Darrell_Sawyer@gateway1.ATK.COM

	Subject:	Time:2:33 PM
OFFICE MEMO	HF Digital Bibliography	Date:10/10/94

Someone on the Ham Digital newsgroup was looking for info on PACTOR the other day. This prompted me to go through my files and prepare a bibliography. This was limited, for the most part, to the ham periodical literature. I specifically excluded professional journals and books as these can be easily located through normal liberary research techniques. Thought it might be interesting to the hfsig too. Did I miss any "good ones"?

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From FORRERJ@frl.orst.edu Mon Oct 17 11:08:35 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qwubw-00011VC; Mon, 17 Oct 94 11:08 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id BAA19431 for <HFSIG@tapr.org>; Mon, 17 Oct 1994 01:47:09 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
Mon, 17 Oct 94 9:08:08 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Mon, 17 Oct 94 9:07:54 PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: HFSIG@tapr.org
Date: Mon, 17 Oct 1994 09:07:54 PST8PDT
Subject: High Speed HF modem progress
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <54FDDFE3172@frl.orst.edu>

Hi all,

I have put a posting out on Usenet for more on an "HF channel simulator" and have received some (not much though) feedback. There apparently are narrow band and wide band simulators, the latter being for spread spectrum (SS) applications and there are some interest presently by the military in this. We are mostly interested in a narrow-band simulator, that, by the way, can be a very complex thing if indeed you want to simulate the behavior at a particular location at aparticular instant in time. Those of you that have played with"IONCAP" and similar program will have some idea what this involves. There is also a much simpler simulation using the CCIR "good" and "poor" recommendations. These models allows one to adjust S/N settings and allows the modem to be evaluated in alittle as 0.1 dB steps. I have some scanty specs on the CCIR model can anyone help with obtaining a copy of this? (It is in the Dubrovnic plenary session, ca. 1989).

Otherwise, I am in the process of bringing up a 100 baud QPSK single tone modem. It is possible that such an arrangement using two parallel channels will allow robust 400 bps using a regular RTTY channel bandwidth (without coding with Golay (24,12) the rate would be 200 bps). This code will run on the Cardinal soundcard. The CCIR channel simulator will also run on the Cardinal sound card.

Does anyone have any ideas on spread spectrum implementations for HF?

I have not heard much from anyone being interested in participating in code development. You are missing out on some very interesting and educational opportunities. If I you are interested, let us hear from you.

73's

Johan
KC7WW

From barry@ia.net Mon Oct 17 14:53:54 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qwy7u-000187C; Mon, 17 Oct 94 14:53 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id OAA21349 for hfsig@tapr.org; Mon, 17 Oct 1994 14:53:24 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410171953.OAA21349@allanon.ia.net>
Subject: BBS with 2 HF ports?
To: hfsig@tapr.org
Date: Mon, 17 Oct 1994 14:53:23 -0500 (CDT)
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 399

Hi

I realize this is not the current topic, but a list of BBSs which have ports on 2 or more frequencies would be of some value. THe BBSSIG is making a table of states/substate identifiers and a list of these hf net interconnects would be of value.

Does someone have such a list?
Could we build one for first hand information?

I am willing to compile this list if that will help.

73 Barry

From shane@mdd.comm.mot.com Tue Oct 18 12:13:32 1994
Return-Path: <shane@mdd.comm.mot.com>
Received: from motgate.mot.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxI6K-0000hEC; Tue, 18 Oct 94 12:13 CDT
Received: from pobox.mot.com ([129.188.137.100]) by motgate.mot.com with SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)

          id AA08580; Tue, 18 Oct 1994 12:13:22 -0500
Received: from mdd.comm.mot.com (mdisea.mdd.comm.mot.com) by pobox.mot.com with
SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA20150; Tue, 18 Oct 1994 12:13:20 -0500
Received: from daffyduck.mdd.comm.mot.com by mdd.comm.mot.com (4.1/SMI-4.1)
     id AA12011; Tue, 18 Oct 94 10:13:14 PDT
Received: by daffyduck.mdd.comm.mot.com (4.1/SMI-4.1)
     id AA14182; Tue, 18 Oct 94 10:13:12 PDT
Date: Tue, 18 Oct 1994 10:13:11 -0700 (PDT)
From: Hugh Shane <shane@mdd.comm.mot.com>
X-Sender: shane@daffyduck
To: hfsig@tapr.org
Cc: hfsig@tapr.org
Subject: Re: [HFSIG:14] High Speed HF modem progress
In-Reply-To: <54FDDFE3172@frl.orst.edu>
Message-Id: <Pine.SUN.3.90.941018095228.29382K-100000@daffyduck>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

Johan,

Forgive the delay in responding to your recent postings. They contain a
lot of information and it's taken me some time to hoist in even part of
it!

>
> I have put a posting out on Usenet for more on an "HF channel simulator" and
> have received some (not much though) feedback. There apparently are narrow

I did a literature search on the University of Washington's online
catalog and couldn't find a single reference to HF channel simulators. I
haven't had a chance to manually search the IEEE index.

> allows the modem to be evaluated in alittle as 0.1 dB steps. I have some
> scanty specs on the CCIR model can anyone help with obtaining a copy of
> this? (It is in the Dubrovnic plenary session, ca. 1989).

If you can send some more information I'll try the UoW engineering library.

>
> Otherwise, I am in the process of bringing up a 100 baud QPSK single tone
> modem. It is possible that such an arrangement using two parallel channels
> will allow robust 400 bps using a regular RTTY channel bandwidth (without
> coding with Golay (24,12) the rate would be 200 bps). This code will run
> on the Cardinal soundcard. The CCIR channel simulator will also run on the
> Cardinal sound card.

The sound card seems like a good approach. TAPR's DSP-93 is pricey and
has a long delivery time.

>
> Does anyone have any ideas on spread spectrum implementations for HF?

>

I've done some work with narrow-band spread spectrum transmission of digital video over wireline. (This was some years ago and so we were doing everything in hardware. These days a run of the mill DSP could do the same thing.) This approach may be applicable to HF but I have no experience with this application. One observation I could make is that the scheme we used seemed to be quite sensitive to the phase distortion of the channel. I suspect the phase distortion of the HF channel is going to present a challenge regardless of the modulation scheme we pick.

> I have not heard much from anyone being interested in participating in code
> development. You are missing out on some very interesting and educational
> opportunities. If I you are interested, let us hear from you.

Please count me in! What's the first task you have in mind?

     Hugh
From jbloom@arrl.org Tue Oct 18 12:34:45 1994
Return-Path: <jbloom@arrl.org>
Received: from uu7.psi.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxIQi-0000lKC; Tue, 18 Oct 94 12:34 CDT
Received: from mgate.arrl.org by uu7.psi.com (5.65b/4.0.071791-PSI/PSINet) via
SMTP;
        id AA18268 for hfsig@tapr.org; Tue, 18 Oct 94 13:34:34 -0400
Received: from arrl.org by mgate.arrl.org with smtp
     (Smail3.1.28.1 #6) id m0qxIOf-000B9aC; Tue, 18 Oct 94 13:32 EDT
Received: by arrl.org with Microsoft Mail
     id <2EA40772@arrl.org>; Tue, 18 Oct 94 13:35:46 EDT
From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
To: hfsig <hfsig@tapr.org>
Subject: HF Channel Simulator
Date: Tue, 18 Oct 94 13:35:00 EDT
Message-Id: <2EA40772@arrl.org>
Encoding: 15 TEXT
X-Mailer: Microsoft Mail V3.0

Johan -- I'm interested in the HF channel simulator project. I've ordered a copy of CCIR Rec. 520-1, which I think includes specifications for CCIR standard channels. In Kantronics' May, 1994 QEX article about G-TOR, they refer to an HF channel simulator they used to test their G-TOR system. This simulator used a TMC320C30 and implemented the "good, moderate, poor and flutter fading channels prescribed by the CCIR as recommended for simulator test channels." That seems like a good place to start. I should have the document in a week or so and will report here on what I find out about the CCIR standards.

Then again, maybe I'm behind the power curve and the rest of you already know all about these CCIR recommended channels?

 -- Jon, KE3Z
From jbloom@arrl.org Tue Oct 18 12:45:53 1994

Return-Path: <jbloom@arrl.org>
Received: from uu7.psi.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxIbW-0001KpC; Tue, 18 Oct 94 12:45 CDT
Received: from mgate.arrl.org by uu7.psi.com (5.65b/4.0.071791-PSI/PSINet) via
SMTP;
        id AA19519 for hfsig@tapr.org; Tue, 18 Oct 94 13:45:52 -0400
Received: from arrl.org by mgate.arrl.org with smtp
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     id <2EA40A15@arrl.org>; Tue, 18 Oct 94 13:47:01 EDT
From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
To: hfsig <hfsig@tapr.org>
Subject: RE: [HFSIG:17] HF Channel Simulator
Date: Tue, 18 Oct 94 13:43:00 EDT
Message-Id: <2EA40A15@arrl.org>
Encoding: 6 TEXT
X-Mailer: Microsoft Mail V3.0

Oh, I should also mention that the November QEX editorial is about the need
for HF channel simulation and refers to this mailing list, with instructions
on how to access it. Maybe that'll drag a few more people into the mix.

 -- Jon
From FORRERJ@frl.orst.edu Tue Oct 18 13:50:01 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
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Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id EAA25983 for <hfsig@tapr.org>; Tue, 18 Oct 1994
04:28:55 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Tue, 18 Oct 94 11:49:56 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Tue, 18 Oct 94 11:49:48
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Tue, 18 Oct 1994 11:49:42 PST8PDT
Subject: Re: [HFSIG:16] Re: High Speed HF modem progress
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <56A91835976@frl.orst.edu>

Hi Hugh,

I must apologize that we jumped into the deep end - if you are
somewhat overwhelmed by the details, hang in there.

The channel simulator would play an important and necessary role during
evaluation. From re-reading Ken Wickwire's excellent QEX articles (ca.
1992) and also from Freeman's handbook, I found that CCIR rep. 549-2 (XVI

th Plenary Assembly, Dubnovrik, 1986, Vol III) contains a wealth on this topic. Likewise, have found that our library does not have these reports, so hopefully, someone else may be able to help out. I note that Jon may be able to help there - we will appreciate any efforts to locate this source of information.

It is obvious that a full-blown channel simulator is a very complex thing, perhaps a project that someone could pursue, however, a simpler model, that perhaps includes multipath with variable delay, fading rate, channel bandwidth and S/N, may suffice to get us on the right track. It would be really great if we could establish a few norms for the known modulation schemes under such conditions and then direct efforts into those that are most promising.

Regarding the DSP platform - the TAPR DSP-93 is a fine design and in time will establish a good base of users and applications. Personally I have found the DSP sound card approach quite attractive for development work and have collected a number of useful tools along the way. I also am interested in the possibilities of integrating this hardware into the mainstream OS. You probably are aware that there are some very innovating DSP- related API components under development that will come on-line in the near future.

Presently I am working on DSP code subroutines that would be needed in just about all future demodulators - low distortion cosine and sine generators where carrier frequency and sample rate may be variable, i.e. for splitting a signal into its I/Q components, PLL's, Costa's loops etc. It becomes a relatively painless process to build demodulators - building good AGC, phase scynchronisers, bit clock extractors, however, still remains the challenge. This software uses, as a basis, the demo software for a sound card that accompanies an article that will feature in the November issue of QEX. I'll be happy to share the code with those experimenting with a Cardinal or Orchid sound card.

>From your comments on SS, it appears that I need to do more homework on SS. It appears that once we get it to work, it may be the solution to many of our present problems. One question - does it mean that if we have found our efficient modulation scheme, that it is just a matter of implementing it on top of the SS coder/decoder? (pardon my ignorance).

73's

Johan
KC7WW

From Rick_Whiting@ATK.COM Tue Oct 18 15:52:30 1994
Return-Path: <Rick_Whiting@ATK.COM>
Received: from ATK.COM by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxLVL-0000WEC; Tue, 18 Oct 94 15:51 CDT
Received: from gateway1.ATK.COM by ATK.COM (5.65/1.34)
     id AA20157; Tue, 18 Oct 94 15:51:22 -0500
Message-Id: <9410182051.AA20157@ATK.COM>
Date: 18 Oct 1994 16:00:58 -0600
From: "Rick Whiting" <Rick_Whiting@ATK.COM>
Subject: Re: HF Channel Simulation
To: "Post hfsig TAPR" <hfsig@tapr.org>

                        Subject: Time:3:30 PM
  OFFICE MEMO   RE>HF Channel Simulation   Date:10/18/94
I had our Engineering Library run a search of ITU/CCIR docs for HF channel simulation. Interestingly enough, they didn't hit on CCIR Radio Report 549-2 but they did come back with:

Recmn 520-1 Use of High Frequency Ionospheric Channel Simulators - Section 3Ac - Influence of the Ionosphere.

Recmn 520-2 (Same description as above).

Recmn 549-3 (Same description as above).

There were also references to other ITU/CCIR Reports on stuff like adaptive automatic HF radio systems (551-2), multi-frequency-shift keying techniques for HF (702), radiotelegraph circuits network architecture for HF data (995), use of coding diversity on HF data circuits (1132), etc. Looks like a wealth of info. The bad news is that none of these are in our library!

By the way, one of my contacts at Alliant Techsystems' Signal Analysis Center in Annapolis suggested the accession citation of interest is CCIR Radio Report 549-2, "HF Ionospheric Regulations, Channel Simulators, Volume III." CCIR 549-2 was also mentioned by other "posters" to TAPR/hfsig.

73/Rick W0TN

From FORRERJ@frl.orst.edu Wed Oct 19 11:14:41 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxdet-0000p4C; Wed, 19 Oct 94 11:14 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id BAA00222 for <hfsig@tapr.org>; Wed, 19 Oct 1994 01:53:32 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);

Wed, 19 Oct 94 9:14:34 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 19 Oct 94 9:14:27 PST8PDT
From: "Johan Forrer FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 19 Oct 1994 09:14:20 PST8PDT
Subject: Re: [HFSIG:20] Re: HF Channel Simulation
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <57FFB412162@frl.orst.edu>

Hi all,

Thanks for all the good work being done on the channel simulation. I have been promised some additional documentation and also found out a bit more on folks doing this kind of work for a living. Soon as I have more to work with, I'll share the details.

Jon's comment on looking at the QEX article on G-TOR reminded me that I spoke with Glenn Prescott at the last DCC. He is at the Univ. of Kansas and I guess that is where that 320C30-based simulator is located. Does anyone perhaps have Glenn's e-mail address? It may be worth dropping him a line.

Glad to hear from you too Walt - I'll prepare a posting on what I use for DSP development work for those that wish to consider purchasing the right sound card option.

Barry, have you gotten feedback yet on your posting on "2-port" HF capability?

Take care,

Johan
KC7WW
From g4guo@dircon.co.uk Wed Oct 19 15:32:04 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qxhfz-0001BcC; Wed, 19 Oct 94 15:31 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id AA23850
(5.67b/IDA-1.5 for <hfsig@tapr.org>); Wed, 19 Oct 1994 21:32:18 +0100
Received: by dircon.co.uk (5.67b) id AA23846; Wed, 19 Oct 1994 21:32:16 +0100
Date: Wed, 19 Oct 1994 21:32:15 +100 (BST)
From: Charles Brain <g4guo@dircon.co.uk>
Subject: H.F modems
To: hfsig@tapr.org
Message-Id: <Pine.3.89.9410192101.A23693-0100000@tdc.dircon.co.uk>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

Hello,

A good starting place for H.F modems is Proposed Federal Standard 1052. The main body of the standard describes a serial tone modem, Appendix A contains details of a parallel tone modem and Appendix B the Data Link Protocol.

Also anyone developing Mil-Std-188-141A/ FS1045/1046 can get a DOS/Windows package to test it using a sound blaster card from ntia.its.bldrdoc.gov in dist/ale-cd.

My main concern is on what frequencies these modems will be used? They use voice bandwidths so the C.W/RTTY frequencies are probably out and if you go into the voice portions you will be accused of being a slow scan operator!

I would like to see channel adaption discussed, why bother getting the last db of performance when a lot more can be gained by moving to a new channel!

I would be more interested in very robust slow speed modems i.e chirp. The company I work for have developed a chirp modem but I believe it uses about 5x56000 dsps.

Although I have ordered a DSP93 board I tend to think it really isn't powerful enough for more advanced modems.

The 'in' thing appears to be parallel modems using soft decoding and Trellises.

Regards Charles

73 Charles H. Brain G4GUO
E-mail g4guo@dircon.co.uk
Tel Day (0245)353221 Xtn 3254
Eve (0245)469382
TCP/IP g4guo.ampr.org AX25 g4guo@gb7esx
Snail 2 Daisy Court, North Springfield, Chelmsford.
ESSEX. CM1 5QU. U.K

From barry@ia.net Wed Oct 19 15:51:51 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qxhz7-0001N8C; Wed, 19 Oct 94 15:51 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id PAA09357 for hfsig@tapr.org; Wed, 19 Oct 1994 15:51:15 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410192051.PAA09357@allanon.ia.net>
Subject: found CCIR 549-2
To: hfsig@tapr.org
Date: Wed, 19 Oct 1994 15:51:14 -0500 (CDT)
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 1327

Hi all,

I just received a copy of CCIR Report 549-2. It was faxed in here and is readable, but would not survive another fax. A paper copy is on

the way and should be here in a few days.

Quoting the Report

"This Report describes a Gaussian-scatter HF channel model for multiplicative distortion, the expermiental method used to confirm the validity and the bandwidth limitation of this model, and one implementation of an HF simulator based on this model."

The entire Report is about 9 pages and contains 3 figures, 2 nasty looking equations, 20 references, and 2 Annex(s) with 2 more figures.

Figure
1. Power Spectra of the multipath components of a CW signal.
2. Block diagram of HF ionispheric channel models.
3. Tap-gain spectra in validated Gaussian-scatter model.
4. Recording the channel characteristics.
5. Simulation of the channel using recorded characteristics.

Johann, I'll mail you a copy of the Report when I get the real copy.

FREE COPIES!
Well sort of. The first 5 people who request a copy will get one free. Please be able to make some use of it!

Hope this helps,

Barry wa0rjt

barry@ia.net I read this in the evenings.
sys_bjb%afds@hobbes.cca.rockwell.com Stared at continuously 8-5
Central time!

From FORRERJ@frl.orst.edu Wed Oct 19 16:36:51 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qxigi-0000d4C; Wed, 19 Oct 94 16:36 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id HAA02506 for <hfsig@tapr.org>; Wed, 19 Oct 1994 07:15:47 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
Wed, 19 Oct 94 14:36:51 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 19 Oct 94 14:36:30 PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 19 Oct 1994 14:36:26 PST8PDT
Subject: Re: [HFSIG:22] H.F modems

Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <58559841185@frl.orst.edu>

Hello Charles,

Nice to hear from you. You certainly are bringing up a number of issues that have resulted in the formation of this HFSIG - good for you!

Let us entertain a few notions and bring everyone up to speed: The HF modems that Charles are mentioning are all in the family of standards built around MIL-STD-188. This includes a 39 parallel-tone, 16-parallel tone, and 8-ary FSK. The latter one is also known as the ALE format. NTIA makes a CD-ROM test source available, primarily for testing ALE equipment. Some of these modems are capable of 2400 bps (single channel or time-divison multiplexed) and are not shy about fully utilizing a 3kHz bandwidth channel. Several outfits are producing such modems, and they are quite pricey - at least out of reach for the usual radio amateur. In my opinion - (for what its worth) this is more or less brute force bandwidth & power to meet a specific objective. It is my belief that it is our challenge as radio amareurs to come up with something a bit more refined, superior in performance, and affordable. However, these documents makes a good source of information.

The chirp modulation modems that Charles mentions, implements a form of narrow-band SS. I have a couple of papers from the IEE on the theory and implementation details (let me know if you are interested in the references). If you have ever dealt with chirp and chirp-z transforms, you will have some idea what this is all about. This kind of innovation gives me hope that something as innovative will eventually lead to better solutions.

You are quite correct about the modern trend toward parallel modems and clever coding, and we are heading that way too - though, hopefully, by doing our homework first to find out what basic modulation scheme to use - this is the whole idea behind the simulator. Hopefully we will have this basic knowledge shortly and then be able to move on to working on coding theory and eventually protocol.

In an earlier posting I provided a guestimate of the capabilities of a few modulation schemes (some including coding) and shown that a typical single-DSP platform would perhaps (just a guess) be able to handle a x4 parallel situation (using fairly conventional modulation schemes). I hope that we would be able to do at least as good as the CLOVER II system. I am pleased to hear that you took the plunge with the DSP-93 - keep us posted on your developments.

Thanks for your input - keep them coming.

73's

Johan
From FORRERJ@frl.orst.edu Wed Oct 19 16:39:21 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp

(Smail3.1.28.1 #3) id m0qxij8-0001EuC; Wed, 19 Oct 94 16:39 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id HAA02514 for <hfsig@tapr.org>; Wed, 19 Oct 1994 07:18:17 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11); Wed, 19 Oct 94 14:39:20 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 19 Oct 94 14:38:58 PST8PDT
From: "Johan Forrer FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 19 Oct 1994 14:38:55 PST8PDT
Subject: Re: [HFSIG:23] found CCIR 549-2
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <585641372D4@frl.orst.edu>

Barry,

That is great news - looking forward seeing the document.

Johan
From barry@ia.net Wed Oct 19 18:05:51 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp (Smail3.1.28.1 #3) id m0qxk4n-0001I9C; Wed, 19 Oct 94 18:05 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id SAA10200 for hfsig@tapr.org; Wed, 19 Oct 1994 18:05:17 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410192305.SAA10200@allanon.ia.net>
Subject: Re: [HFSIG:25] Re: found CCIR 549-2
To: hfsig@tapr.org
Date: Wed, 19 Oct 1994 18:05:16 -0500 (CDT)
In-Reply-To: <585641372D4@frl.orst.edu> from "Johan Forrer FL" at Oct 19, 94 04:42:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 606

Johan

Sorry I missed on your name!

Send me a good address.

Do you know anyone that works for Rockwell in Dallas? I got the company librarian here in Cedar Rapids to make a few calls. Seems like there might be other items of interest in the lib there, but searching via long distance is not effective. They are very good at the library tasks but I hate to take up their time. We get regular ethics lectures...

I am also aware that the comm division does ALE and other hf
"special" tasks. They might be able to help but are usually reluctant
to go public with their knowledge.

73 Barry wa0rjt

From shane@mdd.comm.mot.com Wed Oct 19 18:37:29 1994
Return-Path: <shane@mdd.comm.mot.com>
Received: from ftpbox.mot.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qxkZS-0001EAC; Wed, 19 Oct 94 18:37 CDT
Received: from pobox.mot.com ([129.188.137.100]) by ftpbox.mot.com with SMTP
(5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA19818; Wed, 19 Oct 1994 18:37:21 -0500
Received: from mdd.comm.mot.com (mdisea.mdd.comm.mot.com) by pobox.mot.com with
SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA17728; Wed, 19 Oct 1994 18:36:04 -0500
Received: from daffyduck.mdd.comm.mot.com by mdd.comm.mot.com (4.1/SMI-4.1)
     id AA14097; Wed, 19 Oct 94 16:36:02 PDT
Received: by daffyduck.mdd.comm.mot.com (4.1/SMI-4.1)
     id AA19268; Wed, 19 Oct 94 16:36:00 PDT
Date: Wed, 19 Oct 1994 16:36:00 -0700 (PDT)
From: Hugh Shane <shane@mdd.comm.mot.com>
X-Sender: shane@daffyduck
To: hfsig@tapr.org
Subject: Re: [HFSIG:19] Re: High Speed HF modem progress
In-Reply-To: <56A91835976@frl.orst.edu>
Message-Id: <Pine.SUN.3.90.941019161433.29382f-100000@daffyduck>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

On Tue, 18 Oct 1994, Johan Forrer FL wrote:

>
> our present problems. One question - does it mean that if we have found our
> efficient modulation scheme, that it is just a matter of implementing it
> on top of the SS coder/decoder? (pardon my ignorance).
>

Our wireline digital video transmission system convolved the data with a
pseudo-noise data stream, converted this to analog, and put the resulting
audio signal on the wire. On the receiving end, a correlation detector was
used to recover the data.

In an RF system the audio would simply be shifted to the desired RF
spectrum using suppressed-carrier frequency-conversion techniques. It
would be interesting to consider how one might do this up-conversion
(and down conversion on the receiving end) digitally. In the HF bands
we're talking about signals that some DSPs could handle.

Well, more food for thought anyway &:)

     Hugh
From shane@mdd.comm.mot.com Thu Oct 20 13:07:20 1994
Return-Path: <shane@mdd.comm.mot.com>
Received: from ftpbox.mot.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qy1tT-0001SlC; Thu, 20 Oct 94 13:07 CDT
Received: from pobox.mot.com ([129.188.137.100]) by ftpbox.mot.com with SMTP
(5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA24690; Thu, 20 Oct 1994 13:07:09 -0500
Received: from mdd.comm.mot.com (mdisea.mdd.comm.mot.com) by pobox.mot.com with
SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA14906; Thu, 20 Oct 1994 11:01:43 -0500
Received: from daffyduck.mdd.comm.mot.com by mdd.comm.mot.com (4.1/SMI-4.1)
     id AA17483; Thu, 20 Oct 94 09:01:40 PDT
Received: by daffyduck.mdd.comm.mot.com (4.1/SMI-4.1)
     id AA02609; Thu, 20 Oct 94 09:01:39 PDT
Date: Thu, 20 Oct 1994 09:01:39 -0700 (PDT)
From: Hugh Shane <shane@mdd.comm.mot.com>
X-Sender: shane@daffyduck
To: hfsig@tapr.org
Subject: Re: [HFSIG:23] found CCIR 549-2
In-Reply-To: <199410192051.PAA09357@allanon.ia.net>
Message-Id: <Pine.SUN.3.90.941020085912.29382k-100000@daffyduck>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

On Wed, 19 Oct 1994, Barry Buelow - WA0RJT wrote:

>
> FREE COPIES!
> Well sort of. The first 5 people who request a copy will get one free.
> Please be able to make some use of it!
>

Dibs! And I'd be happy to reimburse you for copying and postage. Let me
know how much. I'm hoping to be of assistance in designing and coding the
channel simulator.

Hugh Shane
N7UAX
2915 NE 52nd St #402
Seattle, WA 98105
From wdubose@sacdm01.kelly.af.mil Thu Oct 20 13:09:24 1994
Return-Path: <wdubose@sacdm01.kelly.af.mil>
Received: from sacdm01.kelly.af.mil by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qy1v9-0001SlC; Thu, 20 Oct 94 13:08 CDT
Received: by sacdm01.kelly.af.mil (5.65b/1.0.2-rct)
     id AA16818; Thu, 20 Oct 94 13:00:40 -0500
Message-Id: <9410201800.AA16818@sacdm01.kelly.af.mil>
Date: Thu, 20 Oct 94 13:00:25 -0500

From: wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT)
Subject: Introduction
To: hfsig@tapr.org

Greetings All,

Let me introduce myself to the "net".

I am presently employed by the USAF at Kelly AFB, San Antonio Air Logistics Center as Systems Manager for the Central Contracting Contract Data Management Host (spell that office automation). I retired from the AF Reserve in 1993 after 26 years in the reserve program. For the last 14 years in the program, I was Chief of Communications Maintenance for the 32nd Aeromedical Evacuation Group and senior communicator in the Aeromedical Evacuation System.

During Desert Shield/Storm, I was Chief of Communications for the Theater Aeromedical Evacuation System and stationed in Saudi Arabia. The Aeromedical Evacuation System used HF communications exclusively for command and control communications.

The year before Operation Just Cause, the "liberation" of Panama, the AF held an exercise which included having a NCS at Kelly AFB and an operational location in Panama. This, as we were to learn, a good practice for Operation Just Cause. During Just Cause, we learned that the 300 baud (Bell 102 Modem) communications we were using would *not* hack the communications needs for Aeromedical Evacuation (AE). We had begun using a 300 baud communications device/terminal almost 3 years before and it had connectivity problems from the first; however, it was so much better than voice (un-encrypted) communications that we put up with the downside.

Because we fell flat with AE communications during Just Cause, our Major Command arranged a test of high speed data capability using Harris Corp, HF Comm Division's MIL-STD-188-110c modems and a NSA blackbox that used the MIL-STD 39 parallel tone modem in the winter of '90 at Scott AFB. During the test we were able to pass 40K files over HF at 2400 and 4800 BPS with no trouble except for *BIG* QSBs, QRN and QRM. We would lose chunks for the file but what we received was 100% correct. No ARQ was used...just straight RATT (ASCII) with ProCom as the terminal program.

The Major Command (MAJCOM) Chief Surgeon and MAJCOM AE Commander and my unit commander directed me to include a similar demonstration/test during AE's summer 90 exercise at Ft Hunter-Liggett, CA. I arranged for Harris and SAIC/SAIT to bring equipment (the MIL-STD modems and TEMPEST LapTop computers) to demonstrate high speed HF data transmission. We were networked the Navy Hospital Ship on the west Coast, Army and Air Force Medical Units and AE units on HF and compare the capability of our old equipment (300 baud, Bell 102) with the new modems running TCP/IP.

SAIC/SAIT forgot that their software TCP/IP (probably KA9Q NOS) would

be required to key the transmitter. Thus, we could only duplicate the previous demonstration but did confirm that 2400 and 4800 BPS data transmissions on HF were possible. 90 days after the exercise concluded, I was in Saudi.

While in Saudi, we had the opportunity to use Harris ALE and MIL-STD-188-110c modems. The ALE was *NOT* suitable for our network operations (that's another story) and because our AE nets were much like NTS nets, I doubt that ALE will ever work on the hambands.

HF high speed data transmissions did work and work very well. The robustness of these modems running at 2400 BPS at 100 watts provided better thruput than our 300 baud equipment running 1000 watts. Some units found that the MIL-STD modems on 100 watt transceivers worked better that 100/300 baud RATT (ASCII) at 20 KW.

As one of the evaluators of Harris' AN/URC-119 (commercially known as the RF-350 series) HF equipment prior to production and having keep up my relationship with Harris technical personnel, I was privy to the technical information on their MIL-STD-188-110c modems. I also had the opportunity to evaluate Rockwell-Collins HF equipment that was similar to the Harris AN/URC-119 system. The MIL-STD, high speed, robust modems use external DSP technology in their modems to achieve the modem/transmission protocol.

Almost a year ago, Lou, N5SGL, discovered some of Johan's (KC7WW) work and he and I began exchanging E-Mail about robust high speed HF modems using commercial-off-the-shelf (COTS) sound boards. During my many messages with Johan, I have come to believe that hams (those of you with a much high level of technical competency than I) can reproduce the MIL-STD modem/transmission protocols using a DSP/ASP DMA soundcard.

One major question must be answered. Do we (hams) want to simply duplicate these proven MIL-STD modems (that cost a bundle) or roll our own along the same line. The MIL-STD modems BW will (just) fit into a SSB bandpass...but do we want something that wide? The will run 4800 BPS w/o the Reed-Solomon (RS) coding and 2400 with RS coding. How many BPS can we get using a 8 tone (narrow spaced tones), modem running 100 baud and can we keep the BW down to something that hams in general and the FCC will "buy"? Also, the cost of the "system" must be affordable. Should we use Golay or RS encoding for the FEC? Many questions to be answered.

I believe we can obtain 1200 BPS with FEC and ARQ/CRC and 2400 BSP w/o FEC but with ARQ/CRC in a *ROBUST* modem protocol. I truly would like to see a TCP/IP HF WAN (SMTP only) to augment and eventually replace the HF NTS nets.

73,

Walt/K5YFW

Snail-Mail Walt DuBose
            10909 Meadowhome
            San Antonio, Texas 78230

MABELL   HP 210-696-3196
            BP 210-925-6081

VHF-FM*   146.46 (w/CTCSS 146.2) / 147.06 (w/CTCSS 203.5)

UHF-FM*   446.0 (w/CTCSS 146.2)

HF SSB Mobile 7.213 LSB

HF CW (40/20) U_CALL_IT

E-Mail k5yfw@sat.ampr.org (goes to k5yfw@k5yfw.ampr.org & k5yfw@sacdm10)
        (ham stuff...un-official...but important)

E-Mail k5yfw@sacdm10.kelly.af.mil
        (semi-official...all mailgroups including hfsig)

E-Mail wdubose@sacdm01.kelly.af.mil
        (official U.S. Government stuff and emergency communications)

* Just in case you come San Antonio.
From barry@ia.net Thu Oct 20 20:48:01 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qy95K-0001dEC; Thu, 20 Oct 94 20:47 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id
UAA19886 for hfsig@tapr.org; Thu, 20 Oct 1994 20:47:39 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410210147.UAA19886@allanon.ia.net>
Subject: Re: [HFSIG:28] Re: found CCIR 549-2
To: hfsig@tapr.org
Date: Thu, 20 Oct 1994 20:47:38 -0500 (CDT)
In-Reply-To: <Pine.SUN.3.90.941020085912.29382k-100000@daffyduck> from "Hugh
Shane" at Oct 20, 94 01:14:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 494

Hey - you made the cut!

73 Barry

>
>
>
> On Wed, 19 Oct 1994, Barry Buelow - WA0RJT wrote:
>
> >
> > FREE COPIES!

> > Well sort of. The first 5 people who request a copy will get one free.
> > Please be able to make some use of it!
> >
>
> Dibs! And I'd be happy to reimburse you for copying and postage. Let me
> know how much. I'm hoping to be of assistance in designing and coding the
> channel simulator.
>
> Hugh Shane
> N7UAX
> 2915 NE 52nd St #402
> Seattle, WA 98105
>

From g4guo@dircon.co.uk Sat Oct 22 05:19:26 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qydXo-00005ZC; Sat, 22 Oct 94 05:19 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA01823
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Sat, 22 Oct 1994 11:20:02 +0100
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA01808; Sat, 22 Oct 1994 11:19:50 +0100
Date: Sat, 22 Oct 1994 11:19:50 +0100
Message-Id: <199410221019.AA01808@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: Z8530 and WB6YMH mod

Charles Brain <g4guo@dircon.co.uk> writes:
> Hello Folks,
> I am desperatly trying to obtain details os WB6YMH's 'trick' that allows
> a Z8530 SCC chip to act as a dumb serial/parallel converter. I am trying
> to take a serial synchronous bit stream from a modem and process it
> inside a P.C. !HELP!
>
> Regards Charles Brain G4GUO
>
> --
> --
> | 73 Charles H. Brain G4GUO |
> | E-mail g4guo@dircon.co.uk |
> | Tel Day (0245)353221 Xtn 3254 |
> | Eve (0245)469382 |
> | TCP/IP g4guo.ampr.org AX25 g4guo@gb7esx |
> | Snail 2 Daisy Court, North Springfield, Chelmsford. |
> | ESSEX. CM1 5QU. U.K |
> |--|
>
From g4guo@dircon.co.uk Sat Oct 22 05:19:36 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qydXx-00005ZC; Sat, 22 Oct 94 05:19 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id

AA01839
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Sat, 22 Oct 1994 11:20:14 +0100
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA01817; Sat, 22 Oct 1994 11:19:57 +0100
Date: Sat, 22 Oct 1994 11:19:57 +0100
Message-Id: <199410221019.AA01817@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:29] Introduction

Hello Walter

> While in Saudi, we had the opportunity to use Harris ALE and
> MIL-STD-188-110c modems. The ALE was *NOT* suitable for our network
> operations (that's another story) and because our AE nets were much
> like NTS nets, I doubt that ALE will ever work on the hambands.
>

I would be really interested to know why you feel the ALE was unsuitable
for this type of operation. Overhere in Europe we have our doubts as well
but these are to do with the much higher levels of interference especially
during daylight hours.
 Also are you talking about MIL_STD-188-141A or Harris's fast ALE system which
is being developed as part of AHFDS (Advanced HF Data System).
 I believe that some form of narrower band ALE and RTCE is needed to try to spread
activity away from 20 meters and towards the WARC/higher bands.
 I operate Clover from this QTH and so far have only worked stations on 20 meters
even during times when the higher bands have been open. Our H.F bands are a
wonderful
resource that we are hardly even beging to use. I ask you AX25 on 20 meters!
(Oophs sorry no protocol wars!!!).

Regards Charles.
From g4guo@dircon.co.uk Sat Oct 22 06:34:26 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qyeiJ-0000PuC; Sat, 22 Oct 94 06:34 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA05615
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Sat, 22 Oct 1994 12:34:32 +0100
Received: by dircon.co.uk (5.67b) id AA05611; Sat, 22 Oct 1994 12:34:30 +0100
Date: Sat, 22 Oct 1994 12:34:29 +100 (BST)
From: Charles Brain <g4guo@dircon.co.uk>
Subject: Re: [HFSIG:32] Re: Introduction
To: hfsig@tapr.org
In-Reply-To: <199410221019.AA01817@dircon.co.uk>
Message-Id: <Pine.3.89.9410221244.A5544-0100000@tdc.dircon.co.uk>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

Sorry I meant night time and begining!

| 73 Charles H. Brain G4GUO |

| E-mail g4guo@dircon.co.uk |
| Tel Day (0245)353221 Xtn 3254 |
| Eve (0245)469382 |
| TCP/IP g4guo.ampr.org AX25 g4guo@gb7esx |
| Snail 2 Daisy Court, North Springfield, Chelmsford. |
ESSEX. CM1 5QU. U.K

From k5yfw@k5yfw.ampr.org Sat Oct 22 09:22:30 1994
Return-Path: <k5yfw@k5yfw.ampr.org>
Received: from k5yfw.ampr.org by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qyhKy-0001rqC; Sat, 22 Oct 94 09:22 CDT
Date: Sat, 22 Oct 94 08:42:56 CST
Message-Id: <2111@k5yfw.ampr.org>
From: k5yfw@k5yfw.ampr.org (Walter D. DuBose - K5YFW)
Reply-To: k5yfw@sat.n5lyt.ampr.org
To: hfsig@tapr.org
Subject: Re: [HFSIG:32] Re: Introduction
In-Reply-To: Your message of Sat, 22 Oct 94 05:28 CDT
X-Mailer: Bdale's Mailer version PA3AZK.940404 (MSDOS)

Greetings Charles and All,

In Charles message <199410221019.AA01817@dircon.co.uk> he writes:
> Hello Walter
>
> > While in Saudi, we had the opportunity to use Harris ALE and
> > MIL-STD-188-110c modems. The ALE was *NOT* suitable for our network
> > operations (that's another story) and because our AE nets were much
> > like NTS nets, I doubt that ALE will ever work on the hambands.
> >
>
> I would be really interested to know why you feel the ALE was unsuitable
> for this type of operation. Overhere in Europe we have our doubts as well
> but these are to do with the much higher levels of interference especially
> during daylight hours.
> Also are you talking about MIL_STD-188-141A or Harris's fast ALE system which
> is being developed as part of AHFDS (Advanced HF Data System).
> I believe that some form of narrower band ALE and RTCE is needed to try to
spread
> activity away from 20 meters and towards the WARC/higher bands.
> I operate Clover from this QTH and so far have only worked stations on 20
meters
> even during times when the higher bands have been open. Our H.F bands are a
wonderful
> resource that we are hardly even beging to use. I ask you AX25 on 20 meters!
> (Oophs sorry no protocol wars!!!).
>
> Regards Charles.

        You have the correct MIL-STD referenced for the ALE we used.

        The Areomedical Evacuation (AE) net is much like a traffic net here

in the U.S. (Please note I didn't say colonies Charles as I got a personal flame from a super patriot last time I used it...Hi Hi) We had up to 30 or so stations checked into the net on voice and when they need to pass traffic, they called the net station, got permission to call another station and then passed their traffic using a Bell 103, 300 baud, terminal device. This was the normal pre-ALE method.

When we got ALEs on all our Harris HF radios, then the individual station would simply initiate an automatic connect with the station he wished to talk to and when voice contact was established, they would carry on in voice or with their terminal devices. Since there is muting on the audio in monitor mode and the ALE is scanning the 3 or 4 frequencies we were assigned, if another station needed to talk to another station, they pushed the connect button and the ALE went to the channel it had memorized as the place where the called station should be or started calling on each of the assigned/ programmed channels. If on any of those channels there was a voice or data QSO going on, it would place its signaling tone on the frequency it did not recognize it and "stepped" on the QSO. If critical AE data was being passed, it had to be re-transmitted. It really had a way of ruining a QSO as the signaling took many seconds of transmission time on each frequency to establish a connection.

I am afraid that on crowed hambands, unless we have specific frequencies set aside for ALE signalling, we will incur the wrath of many hams. Also, this is compounded by the hidden transmitter effect...even if ALEs were made smart enough to listen for signals and not transmit on channels/frequencies where a QSO existed...it might be able to hear only one side of a QSO thus stepping on the QSO.

I hope I have explained the simply and adequately enough from an operational stand point rather than any technical standpoint.

On another note, I notice that you say "Our H.F bands are a wonderful resource that we are hardly even beging to use." I did notice on several of my trips to Europe and while in Saudi that the HF bands there have *much* less activity than on this side of the pond.

Reference AX.25 on 20 meters. Other than the lack of a good modem...and Johan, KC7WW and give you information on how to build a very good Bell 102 format modem to use on AX.25. However, you must remember that you cannot realiable receive data at over 100 or so baud on HF due to the ever present mulit-path signals...this should be covered in some of HALs writings. I have summerized some of these and am willing to place them here on the SIG if there is interest.

Try going to 110 baud on AX.25 on 20 meters and see if you don't find the thruput much better. Also, run just one connected

session on a frequency or limit it to *no more* than two connected
sessions on a frequency. You may find the thuput comparible to
100 baud RTTY/ASCII with no errors.

73, Walt-k5yfw@home.today

PS, Charles, notice I used the "American" spelling of meters...
Hi Hi. -- k5yfw

From g4guo@dircon.co.uk Sat Oct 22 11:59:38 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qyjn3-00004QC; Sat, 22 Oct 94 11:59 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA04109
(5.67b/IDA-1.5 for <hfsig@tapr.org>); Sat, 22 Oct 1994 17:57:36 +0100
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA04088; Sat, 22 Oct 1994 17:57:33 +0100
Date: Sat, 22 Oct 1994 17:57:33 +0100
Message-Id: <199410221657.AA04088@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:34] Re: ALE

k5yfw@k5yfw.ampr.org (Walter D. DuBose - K5YFW) writes:
> Greetings Charles and All,

If on any of those channels there was a
> voice or data QSO going on, it would place its signaling tone on
> the frequency it did not recognize it and "stepped" on the QSO.
> If critical AE data was being passed, it had to be
> re-transmitted. It really had a way of ruining a QSO as the
> signaling took many seconds of transmission time on each
> frequency to establish a connection.

Hi Walter,
O.K I understand about the problem, The fredricks ALE controller has
a voice detect function, however as they are only using a TMS320C10
I guess it is not very effective. As you say this is a problem. I have
seen an intelligent squelch that uses a DSP in conjunction with a neural
net to recognise speech on a channel, it takes a few hours to train though.
Possibly some form of pilot tone SSB would be more suitable. Or the ALE
could send a "Is the channel free call" I guess there are a lot of diffent
things that could be done.

As far as Chelmsford is concerned no I am not a member although I have
been to the club a couple of times and I am friendly with one of the
committe members. I will pass on your greetings.
By the way I work at Mr Guglielmo's Wireless Works in Chelmsford.

As far as packet is concerned I wonder if it would be possible to
use a DSP based channel conditioner using the HDLC flags as a training
sequence to reduce the multi-path problems. Also if a data frame has to be
sent many times it may be possible to store multiple copies of the frame and
do a majority vote on the data. It should be possible to do this without

a change in the protocol. There is probably some flaw in my idea.

I do think an improved packet protocol for HF is needed, I know a lot of people are thinking about the problem. I would favour a waveform similar to CLOVER i.e using a small number of tones to reduce baud rate and a priority ack protocol.

As far as the English is concerned, my computer speaks Colonial English, anyway my father came from the Canadian Colony so I can just about understand you lot!!

Regards Charles.

From n7oo@huachuca-emh8.army.mil Sat Oct 22 18:08:37 1994
Return-Path: <n7oo@huachuca-emh8.army.mil>
Received: from huachuca-emh8.army.mil by dptspd.sat.datapoint.com with smtp
    (Smail3.1.28.1 #3) id m0qypYA-0000v0C; Sat, 22 Oct 94 18:08 CDT
Message-Id: <m0qypYA-0000v0C@dptspd.sat.datapoint.com>
Date: Sat, 22 Oct 94 16:03:23 MST
From: Jack Taylor <n7oo@huachuca-emh8.army.mil>
To: hfsig@tapr.org
Subject: Re: [HFSIG:35] Re: ALE

Charles Brain suggests some changes could be made to ax.25 to make it more effective for HF operations.

Be advised a revision to the ax.25 standard is "in the works" and is currently before the ARRL futures committee for review. If anyone is interested in looking over the proposed new ax.25 standard it is available via anonymous ftp from hereford.ampr.org /pub/hamradio/lapa.txt. If after review, comments wish to be made, they can be sent to one of the principle authors, bbeech@huachuca-emh8.army.mil.

73 de Jack

From gjones@tenet.edu Sat Oct 22 19:09:35 1994
Return-Path: <gjones@tenet.edu>

Received: from Kay-Abernathy.tenet.edu by dptspd.sat.datapoint.com with smtp
    (Smail3.1.28.1 #3) id m0qyqVA-0001EuC; Sat, 22 Oct 94 19:09 CDT
Received: (from gjones@localhost) by Kay-Abernathy.tenet.edu (8.6.9/8.6.9) id TAA23199 for hfsig@tapr.org; Sat, 22 Oct 1994 19:09:30 -0500
From: Greg Jones <gjones@tenet.edu>
Message-Id: <199410230009.TAA23199@Kay-Abernathy.tenet.edu>
Subject: Re: [HFSIG:36] Re: ALE
To: hfsig@tapr.org
Date: Sat, 22 Oct 1994 19:09:29 -0500 (CDT)
In-Reply-To: <m0qypYA-0000v0C@dptspd.sat.datapoint.com> from "Jack Taylor" at Oct 22, 94 06:11:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 726

Also - the published doc, with the changes the committee requested should be avalible from the ARRL by request the first of the year.

Cheers - greg

According to Jack Taylor:
>
> Charles Brain suggests some changes could be made to ax.25 to make it more
> effective for HF operations.
>
> Be advised a revision to the ax.25 standard is "in the works" and is
> currently before the ARRL futures committee for review. If anyone is
> interested in looking over the proposed new ax.25 standard it is available
> via anonymous ftp from hereford.ampr.org /pub/hamradio/lapa.txt. If after
> review, comments wish to be made, they can be sent to one of the principle
> authors, bbeech@huachuca-emh8.army.mil.
>
> 73 de Jack
>

From rmackay@bud.peinet.pe.ca Sat Oct 22 20:35:35 1994
Return-Path: <rmackay@peinet.pe.ca>
Received: from bud.peinet.pe.ca by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qyrqO-0000v5C; Sat, 22 Oct 94 20:35 CDT
Received: by bud.peinet.pe.ca; id AA12970; Sat, 22 Oct 1994 22:35:27 -0300
Date: Sat, 22 Oct 1994 22:35:26 -0300 (ADT)
From: Ron Mackay <rmackay@bud.peinet.pe.ca>
Subject: Re: [HFSIG:36] Re: ALE
To: hfsig@tapr.org
In-Reply-To: <m0qypYA-0000v0C@dptspd.sat.datapoint.com>
Message-Id: <Pine.3.89.9410222257.A12779-0100000@bud.peinet.pe.ca>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

On Sat, 22 Oct 1994, Jack Taylor wrote:

> Charles Brain suggests some changes could be made to ax.25 to make it more
> effective for HF operations.
>
> Be advised a revision to the ax.25 standard is "in the works" and is
> currently before the ARRL futures committee for review. If anyone is
> interested in looking over the proposed new ax.25 standard it is available
> via anonymous ftp from hereford.ampr.org /pub/hamradio/lapa.txt. If after
> review, comments wish to be made, they can be sent to one of the principle
> authors, bbeech@huachuca-emh8.army.mil.
>
> 73 de Jack
>
Tried to get that file but "permission denied" instead for anonymous
log-in at least.

73 - Ron VE1AIC

From barry@ia.net Sat Oct 22 20:55:07 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qys9G-0000aMC; Sat, 22 Oct 94 20:55 CDT

Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id UAA07692 for hfsig@tapr.org; Sat, 22 Oct 1994 20:54:40 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410230154.UAA07692@allanon.ia.net>
Subject: ASYNC vs Coherent
To: hfsig@tapr.org
Date: Sat, 22 Oct 1994 20:54:39 -0500 (CDT)
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 809

I note that some of the comments on ALE refer to async.

This thought hasn't been a part of the discussions yet but I thought
it would be interesting before we all run off in one direction.

I'm not directly involved with the design of GPS rcvrs, but they
are getting _really_ small, low power and, most important, CHEAP.
Street prices today are still a few hundred $. You can buy reasonable
quantities of multi-channel units for in the range of $300 if you
know where to look.

This all leads to rather good frequency standards being possible in
the not too distand future. Now being is phase lock is a little
different issue, but real good frequency and timing are a start
in the right direction. Knowing where and when to look for a signal
is much different than just free running.

73 Barry
wa0rjt

From g4guo@dircon.co.uk Sun Oct 23 02:54:16 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qyxkr-0001UfC; Sun, 23 Oct 94 02:54 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id AA11966
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Sun, 23 Oct 1994 08:52:24 +0100
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA11958; Sun, 23 Oct 1994 08:52:22 +0100
Date: Sun, 23 Oct 1994 08:52:22 +0100
Message-Id: <199410230752.AA11958@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:38] Re: LAPA

Ron Mackay <rmackay@bud.peinet.pe.ca> writes:
> On Sat, 22 Oct 1994, Jack Taylor wrote:
>
> Tried to get that file but "permission denied" instead for anonymous
> log-in at least.
>
> 73 - Ron VE1AIC

>
>
>

Hi Ron and all,

 Yes I got the same thing!

Regards Charles
From g4guo@dircon.co.uk Sun Oct 23 02:54:23 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qyxkz-0001UfC; Sun, 23 Oct 94 02:54 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA11960
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Sun, 23 Oct 1994 08:52:23 +0100
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA11954; Sun, 23 Oct 1994 08:52:17 +0100
Date: Sun, 23 Oct 1994 08:52:17 +0100
Message-Id: <199410230752.AA11954@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:39] ASYNC vs Coherent

Barry Buelow - WA0RJT <barry@ia.net> writes:
> I note that some of the comments on ALE refer to async.
>
> This thought hasn't been a part of the discussions yet but I thought
> it would be interesting before we all run off in one direction.
>

Hello Barry,

 Certainly a synchronous system should reduce calling time on air. A small
on air pool of calling frequencies could be used then after contact has been
made a QSY to another frequency could be initiated to prevent blocking of the
calling channels.
 Non synchronous "ALE" stations could call asynchronously.

 As we are not a military system we can rely on external time sources, in the
UK we have a transmission on 60 KHz called MSF this is an atomic time standard
you can buy a kit of parts to build a receiver for about $20. I guess WWV could
be used in the U.S. While we wait for GPS to drop in price.

 The next problem is to channelise the HAM bands to allow easier handling in the
database.

 Another big problem is the Radios themselves, when your rig reads say 14.070Mhz
what frequency is it actually on. On SSB the dial frequency should be the
frequency of the suppressed carrier. The other modes well I dont know.
 Also it would be nice to disable the input filtering or have solid state
switching
of the filters as when my TS850 scans I hear the relays clicking (and wearing
out).

Frequency stability is becoming a big issue especially on modes like CLOVER where you have to be within 10 or so Hz of the correct frequency and stay there.

It would be nice if all modern radios had an external frequency reference input.

Timeslots for sounding of stations would have to be arranged so as not to cause collisions.

The modulation scheme during calling would need to be optimised for :
1) Fast recognition.
2) Robustness
3) Easy to measure S/N, BER, MP etc.
4) Measurement of path delay (this could be used to generate simple ionograms)

A spin off of this of course would be a wonderful beacon system.

All of this is perfectly possible with modern technology but I sometimes wonder if the guys using 5 watts and a hand key don't have the right idea.
ALE systems are being developed to reduce the skills required of the operator and turn him into a simple communicator, operating is much of the fun of HAM radio.

Bring back spark!

Regards Charles

From KY1TLuck@aol.com Sun Oct 23 09:46:37 1994
Return-Path: <KY1TLuck@aol.com>
Received: from mail02.prod.aol.net by dptspd.sat.datapoint.com with smtp
    (Smail3.1.28.1 #3) id m0qz4Bu-0000WFC; Sun, 23 Oct 94 09:46 CDT
Received: by mail02.prod.aol.net
    (1.38.193.5/16.2) id AA24759; Sun, 23 Oct 1994 10:46:29 -0400
Date: Sun, 23 Oct 1994 10:46:29 -0400
From: KY1TLuck@aol.com
Sender: KY1TLuck@aol.com
Message-Id: <941023104625991923@aol.com>
To: hfsig@tapr.org
Subject: Official Observers

I, for one, appreciate Greg's efforts at getting appropriate and detailed info regarding this particular OO/FCC matter out into the hands of those subscribed to this list. And I'm glad to see that ARRL HQ's Regulatory Information Branch continues to be so promptly responsive. This is good...

I might be able to shed some light on a couple of other aspects of this matter, since it was I who was in charge of the ARRL/FCC Amateur Auxiliary (Official Observer) program for much of my 7 years at ARRL HQ. And having been an Official Observer Coordinator in the ARRL's volunteer Field Organization in two different ARRL Sections (Virginia and Eastern Massachusetts), I have an unusual perspective from both sides of the fence.
I can understand, for example, why Fred Sober would be writing to FCC. And I can understand -- from the administrative side -- why that's a bad move on Fred's part.

For one thing, it's absolutely forbidden. I know of no less than four Official Observers and two Official Observer Coordinators who were "removed" from their positions because of doing just that. The ARRL gets real jumpy when one of their troops makes contact with FCC, and this instance we're discussing right now is absolutely a PERFECT example of why that's so.
Yah, I know; we all -- most of us anyway -- tend to think that word from Johnny Johnston is somehow that of God himself, FCC-wise. But there's two things to consider carefully:

1. Johnny doesn't work for the enforcement part of FCC. In other words, while he may (and often does) express his opinion about certain Part 97 regulations, they're just that, opinions. They're not binding. Only Part 97 itself is. And let's get back to Part 97 in just a sec.

2. I've personally witnessed the results of a VERY large number of inquiries from amateurs to FCC in the past decade. And I can assure you that, depending on who is telephoned, faxed, written to, pestered at a hamfest, or otherwise communicated with, the resulting opinions from FCC staff can -- and usually are -- remarkably different. This is clearly because of the way the question is posed, and it stands to reason that since we amateurs are typically very bad at communicating (sigh...) we're GOING to get differing opinions.

I'm getting painfully wordy, so let me sum up.

The whole issue is moot. Greg has already correctly put things in perspective; a packet bulletin is NOT, by ANY stretch of the imagination a one-way transmission. Transmissions from one TNC to another are two-way transmissions. Not one-way. Period. Thus, the supposed Notices of Apparent Liability that Fred Sober speaks of will never occur. And if OO notices happen, that's perfectly fine since they don't have the weight of Part 97 enforcement anyway, except by way of friendly amateur-to-amateur peer pressure.

I'd hate to guess how many whining phone calls I got every day for seven years from amateurs who'd gotten "picked on" by OO notices. My usual retort to them was "gee, have you considered throwing the post card in the trash and getting on with your amateur radio activities, OM?" "Well, (sputter, fume), but what are you gonna DO about this jerk who sent me the card, huh?" "well, I might drop him a note, congratulating him for continuing to express his opinions on what he believes would make the bands a better place to hang out". Which usually resulted in more sputtering and fuming, aimed at ME this time, which was probably better than having it aimed at the volunteer who was taking his best -- even if sometimes misguided -- shot.

And, finally, let's all try to remember that this is a non-issue. NALs won't happen, and OO notices don't count, so let's move on.

73

Luck Hurder, KY1T ** KY1TLUCK@AOL.COM **

   Supporter of AMSAT, TAPR, and NARA

From n7oo@huachuca-emh8.army.mil Sun Oct 23 11:08:15 1994
Return-Path: <n7oo@huachuca-emh8.army.mil>
Received: from huachuca-emh8.army.mil by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qz5St-0000d8C; Sun, 23 Oct 94 11:08 CDT
Message-Id: <m0qz5St-0000d8C@dptspd.sat.datapoint.com>
Date: Sun, 23 Oct 94 8:57:40 MST
From: Jack Taylor <n7oo@huachuca-emh8.army.mil>
To: hfsig@tapr.org
Subject: Re: [HFSIG:40] Re: LAPA

I'd forgotten that the lapa.txt file on hereford.ampr.org was a "working
copy" of the proposed revised standard for ax.25 and not available for
anonymous ftp. In view of Greg's comment that the ARRL will be releasing
the document (presumably for comment) in the near future, probably best
to wait for that one. That way will avoid confusion as everyone will be
singing "from the same songbook".
73 de Jack
From barry@ia.net Sun Oct 23 12:46:24 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qz6ye-0000HkC; Sun, 23 Oct 94 12:45 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id
MAA13394 for hfsig@tapr.org; Sun, 23 Oct 1994 12:10:07 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410231710.MAA13394@allanon.ia.net>
Subject: Re: [HFSIG:42] Official Observers
To: hfsig@tapr.org
Date: Sun, 23 Oct 1994 12:10:07 -0500 (CDT)
In-Reply-To: <941023104625991923@aol.com> from "KY1TLuck@aol.com" at Oct 23, 94
09:48:00 am
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 1169

Luck,

I appreciate your comments on the OO and FCC. It is good to have
someone with first hand experience comment.

As you may recall, I threatened to petition the FCC on exactly
this issue a few months ago. At the DCC in Mpls, I attempted
to defend my position that bltns are one-way and therefore
restricted to info bltns.

The attitude of the sysops in the crowd was:

1. ignorance of the rules - I expected better, but wasn't totally
surprised.

2. why bother - no one seems to see that there are NO values and
any topic is acceptable for aa bltn.

Obviously I was disappointed at being laughed off the stage. One
major technical contributor to packet said "let the channels get jammed,
then there will be a reason to go faster".

The major problem I have with this entire episode is that it is one
more reason that people with real brains will leave ham radio. The
idiots are overrunning us and the liberals are letting them.

It is very difficult to keep from screaming "dumb shit" into the
microphone.

If this is an indication of where ham radio is going, I'll go
back to my model trains.

73and thanks again for valuable insights,

Barry wa0rjt

From gjones@tenet.edu Sun Oct 23 15:34:52 1994
Return-Path: <gjones@tenet.edu>
Received: from Kay-Abernathy.tenet.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qz9cw-0000qdC; Sun, 23 Oct 94 15:34 CDT
Received: (from gjones@localhost) by Kay-Abernathy.tenet.edu (8.6.9/8.6.9) id
PAA16608 for hfsig@tapr.org; Sun, 23 Oct 1994 15:34:47 -0500
From: Greg Jones <gjones@tenet.edu>
Message-Id: <199410232034.PAA16608@Kay-Abernathy.tenet.edu>
Subject: BBS Issue
To: hfsig@tapr.org
Date: Sun, 23 Oct 1994 15:34:47 -0500 (CDT)
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 425

Hi Folks - would suggest we move the issue regarding the OO message
concerning packet BBS messages be moved over to the BBSSIG mailing list, and
let the HFSIG continue messages on the current topic.(i.e. simulators and
more).

By the way Johan - I think we can all agree that the current content of the
HFSIG has been just great! Good Job. I really look forward to what the
group will eventually produce.

Cheers - Greg

From barry@ia.net Sun Oct 23 21:35:05 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp

(Smail3.1.28.1 #3) id m0qzFFV-0001UIC; Sun, 23 Oct 94 21:35 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id VAA02872 for hfsig@tapr.org; Sun, 23 Oct 1994 21:34:54 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410240234.VAA02872@allanon.ia.net>
Subject: sorry - wrong SIG
To: hfsig@tapr.org
Date: Sun, 23 Oct 1994 21:34:54 -0500 (CDT)
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 107

Sorry group,
I must have replied to the wrong msg from Luck. I'll try to be more careful.

Barry wa0rjt

From muphaus@cris.com Mon Oct 24 00:41:38 1994
Return-Path: <Muphaus@cris.com>
Received: from cris.com by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qzIA2-0001N6C; Mon, 24 Oct 94 00:41 CDT
Received: from starcore.cris.com by cris.com [1-800-745-CRIS (voice)]
Received: by starcore.cris.com (4.1/SMI-4.1)
id AA06646; Mon, 24 Oct 94 01:41:21 EDT
To: hfsig@tapr.org
From: muphaus@cris.com (Marv Uphaus)
Subject: HFSIG on the Internet...
Date: Sun, 23 Oct 1994 13:13:02 -0500
Organization: CRIS via TELENET
Reply-To: muphaus@cris.com
Message-Id: <kUggkCysSYs8073yn@cris.com>
In-Reply-To: <199410231710.MAA13394@allanon.ia.net>
Lines: 21

Barry wrote:

>It is very difficult to keep from screaming "dumb shit" into the
>microphone.
>
>If this is an indication of where ham radio is going, I'll go
>back to my model trains.

Barry and all...! This is the reason that all this TAPR HFSIG is being done on the Internet and not on a 40 meter digital net... I have been a ham for 39 years and I have seen it getting worse each year... It's the reason that a vast majority of the intelligent hams left ham radio and went to other endeavors, the technical ones to computers... So here we are on the Internet discussing HF radio... hi hi...

Marv... K4BVG...

-- Marv Uphaus -- muphaus@cris.com -- CompuServe: 72122,1253 --
-- PGP Public Key available in plan -- finger muphaus@cris.com --
-- U.S. Mail: 4031 Airport Blvd. #49 -- Mobile, AL 36608 USA --
-- Packet Radio: K4BVG @W4IAX.#MOBAL.AL.USA.NA Ph: 205 343-9256 --
From wdubose@sacdm01.kelly.af.mil Mon Oct 24 08:55:03 1994
Return-Path: <wdubose@sacdm01.kelly.af.mil>
Received: from sacdm01.kelly.af.mil by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzPrE-0000dPC; Mon, 24 Oct 94 08:54 CDT
Received: by sacdm01.kelly.af.mil (5.65b/1.0.2-rct)
     id AA28372; Mon, 24 Oct 94 08:46:09 -0500
Message-Id: <9410241346.AA28372@sacdm01.kelly.af.mil>
Date: Mon, 24 Oct 94 08:45:58 -0500
From: wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT)
Subject: Re: [HFSIG:41] Re: ASYNC vs Coherent
To: hfsig@tapr.org
Reply-To: sat@sacdm01.kelly.af.mil, [D@sacdm01.kelly.af.mil,
        [D@sacdm01.kelly.af.mil, [Dk5yfw@sat.ampr.org
X-Orig-Date: Sun, 23 Oct 94 02:56 CDT
X-Orig-From: Charles Brain <g4guo@dircon.co.uk>
X-Orig-Message-Id: <199410230752.AA11954@dircon.co.uk>

In Charles message of 23 Oct 1994 at 0256 CDT, he writes:
> Barry Buelow - WA0RJT <barry@ia.net> writes:
> > I note that some of the comments on ALE refer to async.
> >
> > This thought hasn't been a part of the discussions yet but I thought
> > it would be interesting before we all run off in one direction.
> >

        Charles and All,

Let me address some of these comments and then I'll go back to other
messages and address some others (perhaps).

I don't think the Harris, or Collins-Rockwell ALE units are concerned
withe being Async or Sync...perhaps I'm missing a thought or two
here. The Fredericks unit is made under license from Harris thus I
would assume it is basically the same unit (cheaper parts? - cheaper
labor?).

>
> Hello Barry,
>
> Certainly a synchronous system should reduce calling time on air. A small
> on air pool of calling frequencies could be used then after contact has been
> made a QSY to another frequency could be initiated to prevent blocking of the
> calling channels.
> Non synchronous "ALE" stations could call asynchronously.

I believe that this would be imperative...but how many? 5, 10? How
wide a channel....5, 1, 1.5, 3 KHz? Who would decide where they

would be located...hams (by agreement), the FCC in the states or other regulatory agency elsewhere or perhaps the IARU? This would require an accurate receiver and ALE signaling is *not* simply a short burst.

For those not familiar with the signaling technique let me briefy describe the process in un-technical terms.

1. The signal is a low baud rate robust signal...this could be made faster.

2. Your receiver is "scanning" all the ALE channels (yes...those frequencies *would* channelize the ham bands) or only those for the mode you wished to use. You should be scanning at a specific rate and if you are scanning more than one band, you need a multi-band antenna...try this on for 40 & 20 meters.

3. The signaling transmitter must transmit a query signal on one channel for a time equal to one complete scan cycle of all the possible channels. Then it moves to the next channel and repeats the process.

Using only four frequencies (channels) in Saudi during the Desert Twins, it took more than two minutes (total cycle query time) to try and establish contact with a station if they never answered.

Can you imagine what it would be like with 10 hams on 20 meters trying to make an ALE connect on just four voice calling frequencies. *And* this does not consider what would happen if someone decided to have a QSO on the ALE channel or simply was coordinating a move to a working frequency. You *would* have to have DSP or sylabic (correct my spelling if incorrect) squelch to keep from steping on a QSO. All of this assumes that you don't have a hidden transmitter...then the matter really gets stickey.

Calling frequencies in the U.S. have never been used as calling frequencies but rather "gathering" channels. How has this worked in other countries/parts of the world? Has it worked any better? Perhaps we in the U.S. are just not as regimented.

>
> As we are not a military system we can rely on external time sources, in the
> UK we have a transmission on 60 KHz called MSF this is an atomic time standard
> you can buy a kit of parts to build a receiver for about $20. I guess WWV could
> be used in the U.S. While we wait for GPS to drop in price.

Why not include a seperate receiver in the ALE equipment if this is needed.

>
> The next problem is to channelise the HAM bands to allow easier handling in the
> database.

Good luck on the HF bands. See above.

>
> Another big problem is the Radios themselves, when your rig reads say 14.070Mhz
> what frequency is it actually on. On SSB the dial frequency should be the
> frequency of the suppressed carrier. The other modes well I dont know.
> Also it would be nice to disable the input filtering or have solid state
switching
> of the filters as when my TS850 scans I hear the relays clicking (and wearing
out).

Ah yes...you *WILL* (yes I screamed) need 10 Hz resolution and accuracy and
no drift and let me tell you as chief of communications maintenance
for the militray using the latest state-of-the-are equipment, maintaing
an accurate 10 Hz resolution drift free transceiver is *not* easy and
the equipment is *expensive*. Tho, software might make this easier,
you would need software that was "rig" specific and assuming all rigs
could be tuned by software/hardware.

> Frequency stability is becoming a big issue especially on modes like
> CLOVER where you have to be within 10 or so Hz of the correct
> frequency and stay there.

See Above.

> It would be nice if all modern radios had an external frequency
> reference input.

This isn't really needed if the units frequency standard is accurate.

> Timeslots for sounding of stations would have to be arranged so as not to cause
> collisions.

Rgr Rgr...see above

> The modulation scheme during calling would need to be optimised for :
> 1) Fast recognition.
> 2) Robustness
> 3) Easy to measure S/N, BER, MP etc.
> 4) Measurement of path delay (this could be used to generate simple ionograms)
>

> A spin off of this of course would be a wonderful beacon system.

I think this is a better solution...a world-wide systems of beacons
to automatically determine band is best with hardware and
software in the users transceiver...making it passive.

All this assumes reciprocity.

> All of this is perfectly possible with modern technology but I
> sometimes wonder if the guys using 5 watts and a hand key don't have
> the right idea. ALE systems are being developed to reduce the
> skills required of the operator and turn him into a simple
> communicator, operating is much of the fun of HAM radio.

> Bring back spark!

Well, I wouldn't go that far...but basic CW is the basic digital mode.

73, Walt/K5YFW@work
From wdubose@sacdm01.kelly.af.mil Mon Oct 24 09:24:42 1994
Return-Path: <wdubose@sacdm01.kelly.af.mil>
Received: from sacdm01.kelly.af.mil by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzQK8-0001ULC; Mon, 24 Oct 94 09:24 CDT
Received: by sacdm01.kelly.af.mil (5.65b/1.0.2-rct)
     id AA29710; Mon, 24 Oct 94 09:16:08 -0500
Message-Id: <9410241416.AA29710@sacdm01.kelly.af.mil>
Date: Mon, 24 Oct 94 09:16:06 -0500
From: wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT)
Subject: Re: [HFSIG:35] Re: ALE
To: hfsig@tapr.org
Reply-To: k5yfw@sat.ampr.org
X-Orig-Date: Sat, 22 Oct 94 12:04 CDT
X-Orig-From: Charles Brain <g4guo@dircon.co.uk>
X-Orig-Message-Id: <199410221657.AA04088@dircon.co.uk>

Again, Greetings.

In Charles message of 22 Oct 1994 at 1204 CDT, he writes:
> k5yfw@k5yfw.ampr.org (Walter D. DuBose - K5YFW) writes:
> > Greetings Charles and All,
>
>   If on any of those channels there was a
> >   voice or data QSO going on, it would place its signaling tone on
> >   the frequency it did not recognize it and "stepped" on the QSO.
> >   If critical AE data was being passed, it had to be
> >   re-transmitted. It really had a way of ruining a QSO as the
> >   signaling took many seconds of transmission time on each
> >   frequency to establish a connection.
>
> Hi Walter,
> O.K I understand about the problem, The fredricks ALE controller has
> a voice detect function, however as they are only using a TMS320C10
> I guess it is not very effective. As you say this is a problem. I have
> seen an intelligent squelch that uses a DSP in conjunction with a neural
> net to recognise speech on a channel, it takes a few hours to train though.
> Possibly some form of pilot tone SSB would be more suitable. Or the ALE
> could send a "Is the channel free call" I guess there are a lot of diffent
> things that could be done.

I think a sylabelic (check/correct my spelling) squelch such as

Kenwood has on one/some of their Marine HF rigs would be all that is needed...perhaps a little more but I don't think a lot of DSP is needed here...perhaps all the voice/data recognitation could be in one small chip.

>
> As far as Chelmsford is concerned no I am not a member although I have
> been to the club a couple of times and I am friendly with one of the
> committe members. I will pass on your greetings.
> By the way I work at Mr Guglielmo's Wireless Works in Chelmsford.

For others, I sent a message to Charles referencing my wonderful visit to the UK several years ago and my visit with the Chelmsford ARC. If you ever have an opportunity to visit the UK, have tea (morning, afternoon, anytime) with the UK hams. They a most wonderful lot. Charles works for the Macaroni Radio Works in Chelmsford...a enormous plant with all sorts of antennae (see Charles, I can spell some things correctly) sticking up all over the place.

> As far as packet is concerned I wonder if it would be possible to
> use a DSP based channel conditioner using the HDLC flags as a training
> sequence to reduce the multi-path problems. Also if a data frame has to be
> sent many times it may be possible to store multiple copies of the frame and
> do a majority vote on the data. It should be possible to do this without
> a change in the protocol. There is probably some flaw in my idea.

    This is for programmers and technical types...please take note.

> I do think an improved packet protocol for HF is needed, I know a
> lot of people are thinking about the problem. I would favour a
> waveform similar to CLOVER i.e using a small number of tones to
> reduce baud rate and a priority ack protocol.

Phil Karn is working on a replacement to AX.25...perhaps his input is needed here.

I don't think we want to mix a transmission protocol with a modem protocol...I've never been comfortable with the layered structure so I don't use it...please excuse this little quirk.

I refer to CLOVER as a modem and transmission protocol. I like to keep them seperate...this is a personal thing so just humor me. While AX.25 may/could use improvement/change/replecement, I'd rather focus on the modem protocol just a bit. The Bell 103 standard is a modem protocol...CLOVER's four parallel tones is a modem protocol, MIL-STD-188-110c (U.S. DoD) 39 parallel tone modem is a modem protocol. Perhaps we first need to create a modem protocol/modem to pulg onto existing transmission protocols...AMTOR, RTTY/ASCII, AX.25, G-TOR, Pactor. Later adding the transmission protocol.

However, for the programmers, it may be easier to do both.

> As far as the English is concerned, my computer speaks Colonial
> English, anyway my father came from the Canadian Colony so I can
> just about understand you lot!!

73, Walt/K5YFW@work
From FORRERJ@frl.orst.edu Mon Oct 24 12:02:36 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzSn3-0000sAC; Mon, 24 Oct 94 12:02 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id CAA07589 for <hfsig@tapr.org>; Mon, 24 Oct 1994
02:41:43 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Mon, 24 Oct 94 10:02:24 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Mon, 24 Oct 94 10:02:01
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Mon, 24 Oct 1994 10:01:55 PST8PDT
Subject: Re: [HFSIG:39] ASYNC vs Coherent
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <5F8C9AD7E20@frl.orst.edu>

Hi Barry

You have a good point here - if we were to lay the groundwork for a new
system, a synchronous approach would probably have definate
advantages. (note that synchronous refers to synchronous detection methods -
there also is synchronous symbol detection, that is something different).

In this regard: from what I gather, a GPS receiver would be an ideal
component in a SS system. Are there any provisions for us doing direct
sequence SS on HF? What would it take - STA? If we can resolve the details
on resolving full monitoring capabilities of amateur radio SS on HF (which
I believe is possible), this may be the answer to our problems.

Am I just day dreaming, or would it be possible to build a
RF spreading/despeading subsystem, say taking a 3 Khz voice channel and
utilizing a slot, say 14.000 - 14.200 Mhz?

73's Johan

From FORRERJ@frl.orst.edu Mon Oct 24 12:14:46 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0qzSxT-0000qMC; Mon, 24 Oct 94 12:13 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id CAA07374 for <hfsig@tapr.org>; Mon, 24 Oct 1994
02:15:55 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
Mon, 24 Oct 94 9:36:37 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Mon, 24 Oct 94 9:36:26
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Mon, 24 Oct 1994 09:36:24 PST8PDT
Subject: Re: [HFSIG:49] Re: ALE
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <5F85C821A8E@frl.orst.edu>

Hi folks,

Wow - I'm pleased to see all the activity. Good stuff!

A few points to respond to:

Sound card details:

The sound card that I'm using contains an Analog Devices ADSP-2115 DSP chip
as well as the standard Windows sound chip, the AD1848. The architecture
for this low cost board was developed by Analog Devices and named
the "Personal Sound Architecture" (PSA). Several companies uses this
chip set on their sound cards, i.e., Cardinal Pro 16 (plus), Orchid
Soundwave 32, Western Digital, Adaptec, Wearnes Beethoven, Echo Speech.
There may be others too.

As far as compatibility is concerned, their digital interface are all the
same, however, there are some differences in audio circuitry. I have some
experience with the Cardinal and the Orchid Soundwave 32. They both work
just fine for DSP dev. work, though are second rate sound cards if that is
what you are looking for. I bought the Orchid product because it uses the
latest and fastest revision of the ADSP-2115 DSP chip, i.e., 20 Mhz vs. the
16 Mhz in the others. The Cardinal Pro 16 is available as low as $80 from
PC Connection - I paid in the $160 range for the Orchid card.

As far as DSP software is concerned - I wrote two articles (and Jon
Bloom and the QEX editorial staff did a great job to make the materials look
very professional) about this card: The August 1994 issue deals
with the hardware registers and how to program it using a free software
toolkit - the second one will appear in the upcoming (November 1994) QEX.

It shows the implementation of an adaptive 100/200 baud DSP HF modem. I think Marv will enjoy that one as it will answer most of his questions.

The PSA architecture was designed with the upcoming Windows 95 (Chicago) DSP API in mind - In the mean time, Analog Devices are giving away free SDK for using this card doing DSP development work under Windows. I have written a few programs using this platform - however, it requires yet another layer of programming and further knowledge of yet another programming philosophy to get even something simple working. It does work reasonably well. I do believe, however, that for our purposes, we would need to stick to writing in assembly and DOS (for a while at least).

Other software that I have available for these PSA cards:

* PSATOR - AMTOR for the PSA cards (RTTY/ASCII will be added in future)
* PSA-Pactor - Pactor for PSA cards. This is a full rx/tx implementation using the adaptive modems mentioned above. It also implements full 16-bit memory ARQ in conjunction with brute force search algorithms. A 386/25 or better computer is required.
* LMS noise reduction - A port of the W9GR code.

These are shareware and I have attempted to keep the UCSD ftp site up to date. However, I will provide copies if you could be so kind to send me a formatted disk and SASE/mailer.

I hope this brief reply answers the questions on hardware / software for the sound card. There are further software tools available, but I dont want to waste further bandwidth on that for the moment.

HF Channel simulator

Lets wait till we have had a chance to study the materials. I think Jon and Hugh both indicated interest in implementation details, so I am sure that we can start exchanging ideas about that shortly.

ALE performance

I think I understand that the present implementation of ALE has both a routing function as well as a messaging structure. What interest me about this protocol, is its modulation scheme - it uses 8-ary FSK and Golay (24,12) coding. It would be relatively easy to implement for amateur radio application - just a thought: perhaps replacing 300 baud packet?

The future of AX.25

Although it may be a while until we progress to the data link layer, I do

think it would be wise if we pay some attention to these efforts. Please keep us posted on what is happening - thanks.

73's

Johan

From g4guo@dircon.co.uk Mon Oct 24 13:57:57 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzUag-0001BLC; Mon, 24 Oct 94 13:57 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id AA06299
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Mon, 24 Oct 1994 18:54:49 GMT
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA06286; Mon, 24 Oct 1994 18:54:42 GMT
Date: Mon, 24 Oct 1994 18:54:42 GMT
Message-Id: <199410241854.AA06286@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: TENTATIVE PROJECT OUTLINE

"Johan Forrer
FL" <FORRERJ@frl.orst.edu> writes:
> Hi All,
>
>
> I trust that you have had an opportunity to look at the modulation
> schemes in Table 1. of my last posting. I thought it would be of
> interest to provide further outlines of those ideas and get some
> discussion and interaction started. Please be so kind and take a
> few moments to study the summary given below.
>
> Remember, the HFSIG can handle multiple active treads, however,
> please be sure to use an appropriate "subject" when you post your
> replies. This way we will know what your message is about.
>
Hello Johan et al,

 I joined the net after you posted this could you email it to me or re-post it please.

 I was thinking if we use these modems in the rtty sections of the band we have a shroud idea of the QRM we are going to see.

1) 170Hz FSK
2) 200Hz FSK
3) CW
4) 4 tone ALE

5) Ourselves!

Regards Charles.
From g4guo@dircon.co.uk Mon Oct 24 13:58:10 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzUas-0001BLC; Mon, 24 Oct 94 13:58 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA06290
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Mon, 24 Oct 1994 18:54:44 GMT
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA06273; Mon, 24 Oct 1994 18:54:37 GMT
Date: Mon, 24 Oct 1994 18:54:37 GMT
Message-Id: <199410241854.AA06273@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:48] Re: ASYNC vs Coherent

wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT) writes:
>
>
> In Charles message of 23 Oct 1994 at 0256 CDT, he writes:
> > Barry Buelow - WA0RJT <barry@ia.net> writes:
> > > I note that some of the comments on ALE refer to async.
> > >
> > > This thought hasn't been a part of the discussions yet but I thought
> > > it would be interesting before we all run off in one direction.
> > >
>
>   Charles and All,
>
> Let me address some of these comments and then I'll go back to other
> messages and address some others (perhaps).
>
> I don't think the Harris, or Collins-Rockwell ALE units are concerned
> withe being Async or Sync...perhaps I'm missing a thought or two
> here. The Fredericks unit is made under license from Harris thus I
> would assume it is basically the same unit (cheaper parts? - cheaper
> labor?).
>

Hi Walt,
 The sync part I was refering to was at call setup. All stations in
the net that are able to scan are listening on the same channel at any
time. This means there is no scanning section to the call. An originating
station can estimate the best channel tune and wait, at the right moment
when everyone is listening it makes the call. This also means that everyone
is listening at the most likely time to hear someone else.
 Net synchronisation is vital, in an amateur environment an external sync
source can be used i.e GPS. In a military environment the network has to
self sync. Normaly this consists of starting in async operation, when one
hears a more senior node in the net that has sync you sync to him etc.
 However when the net starts to get busy performance drops off dramatically.
Sync systems normally have abot 100 channels in the scan group, also every few

minutes a new set of 100 channels are allocated. I have a paper written by
a Prof Carlson in Sweden on this topic.

Regards Charles.
From g4guo@dircon.co.uk Mon Oct 24 14:07:12 1994
Return-Path: <g4guo@dircon.co.uk>
Received: from tdc.dircon.co.uk by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzUjY-0000MCC; Mon, 24 Oct 94 14:07 CDT
Received: from dircon.co.uk (tdc.dircon.co.uk) by tdc.dircon.co.uk with SMTP id
AA08208
  (5.67b/IDA-1.5 for <hfsig@tapr.org>); Mon, 24 Oct 1994 19:04:26 GMT
From: Charles Brain <g4guo@dircon.co.uk>
Received: by dircon.co.uk (5.67b) id AA08195; Mon, 24 Oct 1994 19:04:23 GMT
Date: Mon, 24 Oct 1994 19:04:23 GMT
Message-Id: <199410241904.AA08195@dircon.co.uk>
To: hfsig@tapr.org
Subject: Re: [HFSIG:51] Re: ALE

"Johan Forrer
FL" <FORRERJ@frl.orst.edu> writes:
> ALE performance
> ---------------
>
> I think I understand that the present implementation of ALE has both a
> routing function as well as a messaging structure. What interest me about
> this protocol, is its modulation scheme - it uses 8-ary FSK and Golay
> (24,12) coding. It would be relatively easy to implement for amateur
> radio application - just a thought: perhaps replacing 300 baud
> packet?

Hello again,

 It needs tidying up but I have written some C code that does GOLAY (24,12)
as per the MIL STD encoding and decoding. It uses a look-up table to do
the encoding and also another look up that takes the error syndrome and
finds the error vector which you XOR with the original data, it also tells
you how many errors it has detected so you can either correct or detect.
It seems to work i.e it corrects errors O.K. I used the Parity matrix in
the standard.

Regards Charles
From gjones@tenet.edu Mon Oct 24 14:33:30 1994
Return-Path: <gjones@tenet.edu>
Received: from Kay-Abernathy.tenet.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzV93-0000zWC; Mon, 24 Oct 94 14:33 CDT
Received: (from gjones@localhost) by Kay-Abernathy.tenet.edu (8.6.9/8.6.9) id
OAA22723 for hfsig@tapr.org; Mon, 24 Oct 1994 14:33:23 -0500
From: Greg Jones <gjones@tenet.edu>
Message-Id: <199410241933.OAA22723@Kay-Abernathy.tenet.edu>
Subject: Re: [HFSIG:52] Re: TENTATIVE PROJECT OUTLINE
To: hfsig@tapr.org
Date: Mon, 24 Oct 1994 14:33:19 -0500 (CDT)
In-Reply-To: <199410241854.AA06286@dircon.co.uk> from "Charles Brain" at Oct 24,

94 02:04:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 2045

Just as a reminder, all messages from any of the TAPR SIGs are available by month from the listserv.

Simply send a message to listserv@tapr.org and in the message body state 'index -all' or in this case 'index hfsig'.

This will then get you a listing of the files that can be requested.

The command for that is:

get area filename

Example:
get tapr taprinfo.txt

This would get you the file taprinfo.txt in the area tapr. When you do the index, you will see that the files you want are in an area, so when you do the get, just fillin the area and filename.

This way, anyone can review the entire SIG from the start.

Cheers - Greg

President -- Tucson Amateur Packet Radio Corp

TAPR Office (817) 383-0000 | Internet: gjones@tenet.edu

According to Charles Brain:
>
> "Johan Forrer
FL" <FORRERJ@frl.orst.edu> writes:
> > Hi All,
> >
> >
> > I trust that you have had an opportunity to look at the modulation
> > schemes in Table 1. of my last posting. I thought it would be of
> > interest to provide further outlines of those ideas and get some
> > discussion and interaction started. Please be so kind and take a
> > few moments to study the summary given below.
> >
> > Remember, the HFSIG can handle multiple active treads, however,
> > please be sure to use an appropriate "subject" when you post your
> > replies. This way we will know what your message is about.
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> we have a shroud idea of the QRM we are going to see.
>
> 1) 170Hz FSK
> 2) 200Hz FSK
> 3) CW
> 4) 4 tone ALE
> 5) Ourselves!
>
> Regards Charles.
>

From wdubose@sacdm01.kelly.af.mil Mon Oct 24 14:45:53 1994
Return-Path: <wdubose@sacdm01.kelly.af.mil>
Received: from sacdm01.kelly.af.mil by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzVKt-0000VFC; Mon, 24 Oct 94 14:45 CDT
Received: by sacdm01.kelly.af.mil (5.65b/1.0.2-rct)
     id AA07884; Mon, 24 Oct 94 14:37:13 -0500
Message-Id: <9410241937.AA07884@sacdm01.kelly.af.mil>
Date: Mon, 24 Oct 94 14:37:11 -0500
From: wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT)
Subject: Re: [HFSIG:53] Re: ASYNC vs Coherent
To: hfsig@tapr.org
Reply-To: k5yfw@sat.ampr.org
X-Orig-Date: Mon, 24 Oct 94 14:04 CDT
X-Orig-From: Charles Brain <g4guo@dircon.co.uk>
X-Orig-Message-Id: <199410241854.AA06273@dircon.co.uk>

Charles,

In your message of 24 Oct 1994 at 1404 CDT, you write:
> wdubose@sacdm01.kelly.af.mil (WALTER (WALT) D. DUBOSE - PKT) writes:
> >   Charles and All,
> >
> > Let me address some of these comments and then I'll go back to other
> > messages and address some others (perhaps).
> >
> > I don't think the Harris, or Collins-Rockwell ALE units are concerned
> > withe being Async or Sync...perhaps I'm missing a thought or two
> > here. The Fredericks unit is made under license from Harris thus I
> > would assume it is basically the same unit (cheaper parts? - cheaper
> > labor?).
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> Hi Walt,
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> the net that are able to scan are listening on the same channel at any
> time. This means there is no scanning section to the call. An originating
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> when everyone is listening it makes the call. This also means that everyone
> is listening at the most likely time to hear someone else.
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> source can be used i.e GPS. In a military environment the network has to
> self sync. Normaly this consists of starting in async operation, when one
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> Sync systems normally have abot 100 channels in the scan group, also every few
> minutes a new set of 100 channels are allocated. I have a paper written by
> a Prof Carlson in Sweden on this topic.

I'd really hate to tie my HF operation to the presence of a satellite...
If I'm going to do that, I might as well get a nitch on a geosync
bird and send 19.2 data and to heck with HF. Besides will I now have
to have two receivers, coax and antennas just to work HF. And too,
my truck is already filled with radio equipment and antennas..I will
now need another "rig" and antenna on/in the truck and will have to
park in the hot sun to work HF...not under a cool shade tree cause I
gotta receive the satellite.

The reason many U.S. military units use HF is they don't want to
depend on a satellite...their *too easy* to knock out.

Realizing that GPS boxes are and will come down in price, and I'll
need another box for the ALE, I'll soon have a bunch of money in
equipment.

If we don't watch out, an HF rig will cost 2000 PS.

I might add...where's the KISS?

Walt/K5YFW
From barry@ia.net Mon Oct 24 22:53:48 1994
Return-Path: <barry@ia.net>
Received: from allanon.ia.net by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0qzcxD-0001S0C; Mon, 24 Oct 94 22:53 CDT
Received: from localhost (barry@localhost) by allanon.ia.net (8.6.5/8.6.5) id
WAA12461 for hfsig@tapr.org; Mon, 24 Oct 1994 22:53:37 -0500
From: Barry Buelow - WA0RJT <barry@ia.net>
Message-Id: <199410250353.WAA12461@allanon.ia.net>
Subject: Re: [HFSIG:50] Re: ASYNC vs Coherent
To: hfsig@tapr.org
Date: Mon, 24 Oct 1994 22:53:36 -0500 (CDT)
In-Reply-To: <5F8C9AD7E20@frl.orst.edu> from "Johan Forrer
FL" at Oct 24, 94 12:06:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 1841

>
> Hi Barry
>

> You have a good point here - if we were to lay the groundwork for a new
> system, a synchronous approach would probably have definate
> advantages. (note that synchronous refers to synchronous detection methods -
> there also is synchronous symbol detection, that is something different).

exactly what I was thinking. tx and rx in at least freq sync and possibly
in phase sync.
>
> In this regard: from what I gather, a GPS receiver would be an ideal
> component in a SS system. Are there any provisions for us doing direct
> sequence SS on HF? What would it take - STA? If we can resolve the details
> on resolving full monitoring capabilities of amateur radio SS on HF (which
> I believe is possible), this may be the answer to our problems.
>

It seems to me that any serious improvement is hf throughput is not
going to come from an inexpensive chrome box that plugs in to the mic
and speaker jacks.

There is a cascading effect.   Good throughput requires good freq/time
stability. 99.99% of off the shelf rigs do NOT support external freq
references.

Without addressing SS for now, this leads to a total system design:
timebase, tx, rx, modem. Consider that a good system out to be
something in the 50 to 100W range, and doesn't need all the chrome
and knobs of typical modern radios, single band or a couple of bands,
what else?

This is a rather substantial design task, but it brings all the important
technical issues into play. Major flexibility of operation issues are
not a design requirement.

If this system cost $1000, it would be a huge bargain.

> Am I just day dreaming, or would it be possible to build a
> RF spreading/despeading subsystem, say taking a 3 Khz voice channel and
> utilizing a slot, say 14.000 - 14.200 Mhz?
>
> 73's Johan
>
Just dreaming along...

73 Barry

From shane@mdd.comm.mot.com Tue Oct 25 23:35:15 1994
Return-Path: <shane@mdd.comm.mot.com>
Received: from motgate.mot.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r004t-0000uPC; Tue, 25 Oct 94 23:35 CDT
Received: from mothost.mot.com ([129.188.137.101]) by motgate.mot.com with SMTP
(5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)

          id AA25218; Tue, 25 Oct 1994 20:24:26 -0500
Received: from mdd.comm.mot.com (mdisea.mdd.comm.mot.com) by mothost.mot.com with
SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA15114; Tue, 25 Oct 1994 12:31:36 -0500
Received: from daffyduck.mdd.comm.mot.com by mdd.comm.mot.com (4.1/SMI-4.1)
     id AA02407; Tue, 25 Oct 94 10:03:33 PDT
Received: by daffyduck.mdd.comm.mot.com (4.1/SMI-4.1)
     id AA19089; Tue, 25 Oct 94 10:03:31 PDT
Date: Tue, 25 Oct 1994 10:03:26 -0700 (PDT)
From: Hugh Shane <shane@mdd.comm.mot.com>
X-Sender: shane@daffyduck
To: hfsig@tapr.org
Subject: Re: [HFSIG:51] Re: PSA
In-Reply-To: <5F85C821A8E@frl.orst.edu>
Message-Id: <Pine.SUN.3.90.941025091408.15133A-100000@daffyduck>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

On Mon, 24 Oct 1994, Johan Forrer FL wrote:

>
> As far as compatibility is concerned, their digital interface are all the
> same, however, there are some differences in audio circuitry. I have some
> experience with the Cardinal and the Orchid Soundwave 32. They both work
> just fine for DSP dev. work, though are second rate sound cards if that is
> what you are looking for. I bought the Orchid product because it uses the

Is the audio interface on these cards sufficient for digital communication?

>
> The PSA architecture was designed with the upcoming Windows 95 (Chicago)
> DSP API in mind - In the mean time, Analog Devices are giving away free SDK
> for using this card doing DSP development work under Windows. I have
> written a few programs using this platform - however, it requires yet
> another layer of programming and further knowledge of yet another
> programming philosophy to get even something simple working. It
> does work reasonably well. I do believe, however, that for our purposes, we
> would need to stick to writing in assembly and DOS (for a while at least).
>

How about Linux? With it's multitasking capabilities, Linux is an excellent
platform for packet. And, of course, for software development you can't
beat Unix. All we need are Linux driver for the Personal Sound
Architecture and Unix-hosted development tools.

> Other software that I have available for these PSA cards:
>
> * PSATOR   - AMTOR for the PSA cards (RTTY/ASCII will be added in future)
> * PSA-Pactor - Pactor for PSA cards. This is a full rx/tx implementation
>   using the adaptive modems mentioned above. It also implements
>   full 16-bit memory ARQ in conjunction with brute force search

> algorithms. A 386/25 or better computer is required.
> * LMS noise reduction - A port of the W9GR code.

How about K9NG/G3RUH modulation? (I'm also putting together a node for our local VHF TCP/IP network.)

73
Hugh

From FORRERJ@frl.orst.edu Wed Oct 26 10:38:09 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0r0AQQ-00015nC; Wed, 26 Oct 94 10:38 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id BAA18116 for <hfsig@tapr.org>; Wed, 26 Oct 1994 01:17:10 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
Wed, 26 Oct 94 8:37:56 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 26 Oct 94 8:37:40 PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 26 Oct 1994 08:37:40 PST8PDT
Subject: Re: [HFSIG:58] Re: PSA
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <62763272701@frl.orst.edu>

Hugh,

My experiences with the audio of the sound card tells me that its more than adequate for our usage. The modems that I have played with only runs at a minimal sampling rate of 5.5125 kHz and I have found the anti-aliasing/recon filters very effective to be able to run at that low sample rate. The LMS noise reducer runs at about 19 kHz and the audio quality is quite good, if not better than the commercial boxes doing the same thing. The only thing that the card does not have is digital I/O. However, someone with a bit of ingenuity can fabricate a "port". I use a serial port on the host for that purpose in the interim.

Tom, HB9JNX has written 1200 and 9600 baud packet modems for the card - I have no further details except knowing of its exsistance. I do know, however, that he told me that he built a direct interface to the DSP's "SPORT" for data I/O. So - it can be done. Tom has been very quiet lately, so I dont know the status of that project of his. It would be real nice if we can make a 9600/G3RUH modem available for the card. Perhaps you should be the one do it?

I hope to post a summary on materials that I have been working on regarding modulation schemes and possible ways of debugging/evaluating the system, by monday.

Please give your thoughts on your DSP platform high priority - the learning curve is real steep and we will be starting to do some real stuff in the very near future. Let me assure you - there is a lot of fun ahead!

Hope I addressed all the questions.

73's

Johan

From FORRERJ@frl.orst.edu Wed Oct 26 10:52:24 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0r0AeE-0001GGC; Wed, 26 Oct 94 10:52 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu (8.6.9/8.6.9) with SMTP id BAA18184 for <hfsig@tapr.org>; Wed, 26 Oct 1994 01:31:31 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
Wed, 26 Oct 94 8:52:17 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 26 Oct 94 8:52:12 PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 26 Oct 1994 08:52:11 PST8PDT
Subject: Re: [HFSIG:58] Re: PSA
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <627A1243BB7@frl.orst.edu>

Hugh,

About Linux - I have a system that is used for experimentation. And I do think that it has tremendous capabilities, unfortunately, however, it is a very fast moving target and I have found myself maintaining the OS more than doing any exiting DSP development work. A DSP platform for Linux will probably require a kernel hack similar to the AX.25 project for Linux - You really have to know what you are doing. I do believe that one could probably put something really nice together.

On the other hand - if you are interested in wider audience, Linux is somewhat out on a limb. There really is only one fellow doing the sound drivers (and he has quit doing that), and from what I gathered, it is quite generic - a far cry from trying to actually run your own DSP code on your sound card. On the other side of the coin, with the battle going on between the Microsoft and OS/2 worlds, something useful may emerge. In following the DSP API developments for these new OS's it appears there are some good things in stall - of coarse not for ham radio, but for multimedia running on DSP's. Fortunately we will be able to fit right into the picture with our work. So have good faith.

Sorry for the distraction - this has little to do with HF digital but
thought I would give my two cents worth.

--Johan

From shane@mdd.comm.mot.com Wed Oct 26 12:40:34 1994
Return-Path: <shane@mdd.comm.mot.com>
Received: from ftpbox.mot.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0CKu-0001QRC; Wed, 26 Oct 94 12:40 CDT
Received: from pobox.mot.com ([129.188.137.100]) by ftpbox.mot.com with SMTP
(5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA12114; Wed, 26 Oct 1994 12:40:21 -0500
Received: from mdd.comm.mot.com (mdisea.mdd.comm.mot.com) by pobox.mot.com with
SMTP (5.67b/IDA-1.4.4/MOT-3.1 for <hfsig@tapr.org>)
          id AA14394; Wed, 26 Oct 1994 12:39:05 -0500
Received: from daffyduck.mdd.comm.mot.com by mdd.comm.mot.com (4.1/SMI-4.1)
     id AA25083; Wed, 26 Oct 94 10:39:02 PDT
Received: by daffyduck.mdd.comm.mot.com (4.1/SMI-4.1)
     id AA15389; Wed, 26 Oct 94 10:39:01 PDT
Date: Wed, 26 Oct 1994 10:39:00 -0700 (PDT)
From: Hugh Shane <shane@mdd.comm.mot.com>
X-Sender: shane@daffyduck
To: hfsig@tapr.org
Subject: Re: [HFSIG:59] Re: PSA
In-Reply-To: <62763272701@frl.orst.edu>
Message-Id: <Pine.SUN.3.90.941026101729.15133C-100000@daffyduck>
Mime-Version: 1.0
Content-Type: TEXT/PLAIN; charset=US-ASCII

> lately, so I dont know the status of that project of his. It would be real
> nice if we can make a 9600/G3RUH modem available for the card. Perhaps you
> should be the one do it?

This would be a tasty project indeed! Is this the appropriate place to
begin a discussion on this topic, or is there another SIG that would be
better.

>
> Please give your thoughts on your DSP platform high priority - the learning
> curve is real steep and we will be starting to do some real stuff in the
> very near future. Let me assure you - there is a lot of fun ahead!
>

In comparing DSP platforms I consider performance, features, compatibility, price, and availability. IMHO, for our purposes, there are only two contenders for a DSP platform at this time: the PSA-class boards and the TAPR DSP-93. The PSA solution has adequate performance, is reasonably priced and available now. However, it only works with ISA/EISA machines and is not code compatible with the TAPR product, which has a large code base that is certain to grow in the future. On the other hand, the TAPR board is twice as expensive as the PSA boards and has a lead time of half a year.

If I didn't care about what the rest of the ham radio world was doing I'd go with the PSA solution. But I *do* care! Does it make sense to not take advantage of a potentially huge pool of code? Or maybe we should just start our own faction which will have its own devotees and its own code base. Maybe in time this will become the winning solution due to the low price and general availability of the hardware.

I think I'll continue to sit on the fence a little while longer. Can someone push me off?

     Hugh

From FORRERJ@frl.orst.edu Wed Oct 26 13:40:32 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0DGu-0001UVC; Wed, 26 Oct 94 13:40 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id EAA19653 for <hfsig@tapr.org>; Wed, 26 Oct 1994
04:19:36 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Wed, 26 Oct 94 11:40:23 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 26 Oct 94 11:40:05
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 26 Oct 1994 11:40:01 PST8PDT
Subject: Re: [HFSIG:61] Re: PSA
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <62A6D8F00FF@frl.orst.edu>

Hugh,

I see no problem discussing the 9600 baud modem stuff here, though think that if it concerns implementation details, the DSP development SIG would be the right place and may appeal to a wider audience. I think you will get a lot more support there too.

In a future posting (hopefully by monday), I hope to include some important aspects that differentiates the VHF style DSP modems from the intended robust HF DSP modems. They have lots of similarities. i.e.

phase and symbol synchronous, carrier & data extractors from supressed-carrier modulation systems, however, require careful design of signal constallation, and particulaly, robust phase locking - these are much more important than speed. But more on this later.

Johan

From gjones@tenet.edu Wed Oct 26 14:44:30 1994
Return-Path: <gjones@tenet.edu>
Received: from Kay-Abernathy.tenet.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0EGp-0001RzC; Wed, 26 Oct 94 14:44 CDT
Received: (from gjones@localhost) by Kay-Abernathy.tenet.edu (8.6.9/8.6.9) id OAA09751 for hfsig@tapr.org; Wed, 26 Oct 1994 14:44:22 -0500
From: Greg Jones <gjones@tenet.edu>
Message-Id: <199410261944.OAA09751@Kay-Abernathy.tenet.edu>
Subject: Re: [HFSIG:61] Re: PSA
To: hfsig@tapr.org
Date: Wed, 26 Oct 1994 14:44:21 -0500 (CDT)
In-Reply-To: <Pine.SUN.3.90.941026101729.15133C-100000@daffyduck> from "Hugh Shane" at Oct 26, 94 12:47:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 4241

According to Hugh Shane:
> > lately, so I dont know the status of that project of his. It would be real
> > nice if we can make a 9600/G3RUH modem available for the card. Perhaps you
> > should be the one do it?
>
> This would be a tasty project indeed! Is this the appropriate place to
> begin a discussion on this topic, or is there another SIG that would be
> better.

I think you will find that the cards do not have any enough power to handle the 9600 baud full-duplex transmission. From what I have been told it is doubtfull that half-duplex can be done..maybe somebody can reply to this.

This does not stop doing a lower baud with more bps, but current standards favor FSK, for a lot of reasons. I would point you at some of the last TAPR prcoeedings and ARRL DCC articles on 2 and 4 FSK and PSK and the like performance possibilities.

> > Please give your thoughts on your DSP platform high priority - the learning
> > curve is real steep and we will be starting to do some real stuff in the

> > very near future. Let me assure you - there is a lot of fun ahead!
>
> In comparing DSP platforms I consider performance, features,
> compatibility, price, and availability. IMHO, for our purposes, there are
> only two contenders for a DSP platform at this time: the PSA-class boards
> and the TAPR DSP-93. The PSA solution has adequate performance, is
> reasonably priced and available now. However, it only works with ISA/EISA
> machines and is not code compatible with the TAPR product, which has a
> large code base that is certain to grow in the future. On the other hand,
> the TAPR board is twice as expensive as the PSA boards and has a lead time
> of half a year.

With hope, a mfg will pick up the DSP-93 design and mfg it for much less
than what we are doing it for as kits. The reason for doing the DSP-93 is
not to make money at selling kits, but to open up the technology (which
has been the goal since 1988). With the DSP-12 from LL Grace leaving the
market that now leaves the AEA units as the only commerically available
unit (from amateur suppliers).

I don't know if you can remember back to the TNC-2 introduction, but those
kits were sold for $250+ and within two years were available for $150.
We hope that the DSP-93 technology can happen in the same way. If the unit
is done as all SMA technology and as one board and is done outside the US,
I figure that cost would a lot less than what we can do it in small qtys
and as kits.

So - if you like the design, and dont want to either 1) wait for a kit and
2) spend $430 (which is a bargin for what it does) then you should be
calling up your favored mfg and asking him when they are going to talk to tapr
about OEMing the technology :-)

> If I didn't care about what the rest of the ham radio world was doing I'd
> go with the PSA solution. But I *do* care! Does it make sense to not take
> advantage of a potentially huge pool of code? Or maybe we should just
> start our own faction which will have its own devotees and its own code
> base. Maybe in time this will become the winning solution due to the low
> price and general availability of the hardware.

I think you will see that code is developed for all platforms and a lot of
it will be ported between systems. The reason for going with one solution
or another is what you want to do. If you need two radio ports, the
interface to the radios, and processor and power to do 9600 baud full-duplex
or the like then the DSP-93 is a solution.

If you want to do modulations that require the A/D power but not
all the processor power than a sound card is a good solution. Just don't
forget that with the sound card you still need all the radio interface
depending on what you are wanting to do...that is one reason the DSP-93 is
more expensive to start with - it has all the interface builtin.

> I think I'll continue to sit on the fence a little while longer. Can someone
> push me off?

Probably not a bad decision. If you have a modem you are happy with now,
then you should stick with it. You will want to purchase a DSP unit if 1)
you want to experiment and 2) there is a new mode that requires it.
No need to purchase something that will sit around.

Cheers - Greg
From FORRERJ@frl.orst.edu Wed Oct 26 15:02:07 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0EXt-0001OjC; Wed, 26 Oct 94 15:02 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id FAA20172 for <hfsig@tapr.org>; Wed, 26 Oct 1994
05:41:14 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Wed, 26 Oct 94 13:02:00 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Wed, 26 Oct 94 13:01:33
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Wed, 26 Oct 1994 13:01:31 PST8PDT
Subject: Re: [HFSIG:63] Re: PSA
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <62BC9234604@frl.orst.edu>

Hi Greg,

Could you pse post the actual reference to DCC and TAPR docs that have the
FSK/PSK performance specs for everyone's benefit - would be great - thanks.

-Johan
From FORRERJ@frl.orst.edu Thu Oct 27 14:54:15 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0atn-00017OC; Thu, 27 Oct 94 14:54 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id FAA25364 for <HFSIG@tapr.org>; Thu, 27 Oct 1994
05:33:11 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Thu, 27 Oct 94 12:54:00 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Thu, 27 Oct 94 12:53:53
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: HFSIG@tapr.org
Date: Thu, 27 Oct 1994 12:53:49 PST8PDT
Subject: DEMODULATOR TESTING ETC.
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <643A91E04AC@frl.orst.edu>

Hi all,

Thanks for the words of encouragement - the HFSIG is only what we make it to be and it is heartwarming to see that there still is amateur spirit to push the envelope.

Re: the DSP platform: I hope we dont waste too much time on a silly issue of who has more marbles. The DSP soundcard will do 9600 baud - I dont know who told Greg otherwise, just to put the record straight - look at the Scout 14.4K modems, they use the same family DSP chip. Trying to compare these platforms are like comparing a Caddy to a Jeep - both will do 90 on the freeway, but they are ultimately for different purposes. The DSP-93 has excellent capabilities - especially a capable strong support group - that is vital if you are just starting out - lots of "free" software - and it could be used as a free-standing DSP box. I hope they get all the support to make their efforts worthwhile - that box must succeed.

However, for those that are going to become deeply involved in the development and testing aspects, the DSP development platform requirements are going to become much more complex - for example, the real-time channel simulator probably will be running on its own DSP processor with input - output channels to take the signal from the modulator, add the simulated effects, and play it out in real time on the output channel to the demodulator under test. This probably means a DSP platform for the modulator and another for the demodulator. Add to that DSP diagnostic tools, i.e. to display parts of the signal or constallations, logging of results etc.... That adds up to two PC platforms and three DSP development systems. Perhaps you will now understand why I am using $80 sound DSP sound cards. If anyone can suggest another approach, I'll be really interested.

However, if you are only planning to participate in actual over the air testing, a modest PC, i.e. 486/33 and either a DSP-93 or DSP sound card will do just fine. At this level, I am confident that code for either approach will be made available for you to participate in these tests.

By monday I'll put forward a rough proposal on something that we can start working on - unfortunately we do not have anything yet on the simulator, but I have good faith that we can put something very rudimentary together that will do for starters. If we keep things generic, and write algorithms in psuedo-code, it really wont matter what platform you are going to use at this early stage. Actually, if we follow this approach, you can even write the test code in "C" and run it on your PC - it will be a lot slower and you wont get the same statistical sampling, but all we need to establish initially are the working tolerances for some of the major components. Hopefully things will be a lot clearer after seeing the plan.

I also encourage folks to discuss other topics besides the digital issues - please feel free to do so. Also if you have other ideas on how to go about this journey - let us have your opinions/suggestions.

73's

Johan
From muphaus@cris.com Thu Oct 27 22:11:34 1994
Return-Path: <Muphaus@cris.com>
Received: from cris.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0hj3-0000a5C; Thu, 27 Oct 94 22:11 CDT
Received: from starcore.cris.com by cris.com [1-800-745-CRIS (voice)]
Received: by starcore.cris.com (4.1/SMI-4.1)
     id AA02218; Thu, 27 Oct 94 23:11:19 EDT
To: hfsig@tapr.org
From: muphaus@cris.com (Marv Uphaus)
Subject: Re: [HFSIG:65] DEMODULATOR TESTING ETC.
Date: Thu, 27 Oct 1994 20:38:29 -0500
Organization: CRIS via TELENET
Reply-To: muphaus@cris.com
Message-Id: <LO5ikCysS-LT073yn@cris.com>
In-Reply-To: <643A91E04AC@frl.orst.edu>
Lines: 18

>However, if you are only planning to participate in actual over the air
>testing, a modest PC, i.e. 486/33 and either a DSP-93 or DSP sound card
>will do just fine.

Now, Johan...
Only a few months ago an 8088 would have been a "modest PC"...
hahaha... My, how our perspective changes...!!!

>I also encourage folks to discuss other topics besides the digital issues -

See above... hahaha...

Marv...

-- Marv Uphaus -- muphaus@cris.com -- Ph: 205-343-9256 --
-- PGP Public Key available -- "finger muphaus@cris.com" --
-- U.S.Mail: 4031 Airport Blvd. #49 -- Mobile, AL 36608 --
-- Packet Radio Address -- K4BVG @W4IAX.#MOBAL.AL.USA.NA --
From gjones@tenet.edu Fri Oct 28 15:30:39 1994
Return-Path: <gjones@tenet.edu>
Received: from Kay-Abernathy.tenet.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r0xu6-0001LMC; Fri, 28 Oct 94 15:28 CDT
Received: (from gjones@localhost) by Kay-Abernathy.tenet.edu (8.6.9/8.6.9) id
MAA14326 for hfsig@tapr.org; Fri, 28 Oct 1994 12:56:00 -0500
From: Greg Jones <gjones@tenet.edu>
Message-Id: <199410281756.MAA14326@Kay-Abernathy.tenet.edu>
Subject: Re: [HFSIG:65] DEMODULATOR TESTING ETC.
To: hfsig@tapr.org
Date: Fri, 28 Oct 1994 12:55:59 -0500 (CDT)
In-Reply-To: <643A91E04AC@frl.orst.edu> from "Johan Forrer
FL" at Oct 27, 94 02:57:00 pm
X-Mailer: ELM [version 2.4 PL23]
Content-Type: text
Content-Length: 2329

According to Johan Forrer
FL:
> Re: the DSP platform: I hope we dont waste too much time on a silly issue
> of who has more marbles. The DSP soundcard will do 9600 baud - I dont know
> who told Greg otherwise, just to put the record straight - look at the
> Scout 14.4K modems, they use the same family DSP chip. Trying to compare
> these platforms are like comparing a Caddy to a Jeep - both will do 90 on
> the freeway, but they are ultimately for different purposes. The DSP-93 has
> excellent capabilities - especially a capable strong support group - that
> is vital if you are just starting out - lots of "free" software - and
> it could be used as a free-standing DSP box. I hope they get all the support
> to make their efforts worthwhile - that box must succeed.

I would be real interested in knowing if anyone has 9600 baud FSK implemented on a card device. From my conversations with crystal semiconductor, makers of several of the devices for the sound card industry, they felt that 9600 baud was outside the processing power of the many of the current low-cost devices.

Please keep in mind that 14.4Kbps is 1200 baud with 12 bits of encoding. The problem we have in amateur radio applications with expanding the numbers of bits per baud is the medium we are using - radio. Radio and telephonic operations are considerably different and the S/N must be very good in order to be able to handle the higher order encoding methods.

One thing we should keep in mind is the work Phil Karn is doing on using FEC and symbol rates in such a way to provide some rather robust links.

Both Phil's and Tom's papers on these topics were published in the TAPR 1994 Proceedinsg, which I think sells for $7. I am always forgetting what stuff goes for.

I think we agree that none of us should be getting into pissing contests on performance issues. The idea of any discussion, I would hope within TAPR, would be to do the research, make the informationl available, and then try to implement it in something that provides the widest possible access to amateurs in the community.

The other main reason for not really worrying about performance issues is that whatever we have now - will be 2+ folds more powerful in 5 years.

Cheers - Greg

From jbloom@arrl.org Fri Oct 28 15:43:21 1994
Return-Path: <jbloom@arrl.org>
Received: from uu7.psi.com by dptspd.sat.datapoint.com with smtp
(Smail3.1.28.1 #3) id m0r0y2e-000166C; Fri, 28 Oct 94 15:36 CDT
Received: from mgate.arrl.org by uu7.psi.com (5.65b/4.0.071791-PSI/PSINet) via SMTP;
id AA20140 for hfsig@tapr.org; Fri, 28 Oct 94 09:40:46 -0400
Received: from arrl.org by mgate.arrl.org with smtp
(Smail3.1.28.1 #6) id m0r0rVp-000B9bC; Fri, 28 Oct 94 09:38 EDT
Received: by arrl.org with Microsoft Mail

     id <2EB1002A@arrl.org>; Fri, 28 Oct 94 09:44:10 EDT
From: "Bloom, Jon, KE3Z" <jbloom@arrl.org>
To: hfsig <hfsig@tapr.org>
Subject: RE: [HFSIG:65] DEMODULATOR TESTING ETC.
Date: Fri, 28 Oct 94 09:42:00 EDT
Message-Id: <2EB1002A@arrl.org>
Encoding: 28 TEXT
X-Mailer: Microsoft Mail V3.0

Johan says:
> If we keep things generic, and write algorithms in
>psuedo-code, it really wont matter what platform you are going to use at
>this early stage. Actually, if we follow this approach, you can even write
>the test code in "C" and run it on your PC - it will be a lot slower and
>you wont get the same statistical sampling, but all we need to establish
>initially are the working tolerances for some of the major components.

This is what I'm most interested in: developing and documenting the
algorithms needed to implement all the neat things people are dreaming up,
including the HF channel simulator and faster HF modems, but not limited to
those applications. The algorithms can be documented in pseudo-code, flow
charts, SDL or whatever seems appropriate. Then the algorithm can be
implemented on multiple platforms. My feeling is that we should strive,
where possible, to do work that is platform independent, _then_ transfer
that work to an implementation on a specific platform. If we do a good
algorithm design up front, it will shortly appear as an implementation on
several platforms; there are enough programmers to make that happen.

And, of course, I'd like to see the algorithms documented in QEX! :-)

Regarding the HF channel simulator... it's main use (for us) is to test
other DSP modems, so clearly it has to be running on a separate platform.
The TI DSK strikes me as a good, cheap stand-alone platform. But, as I say,
if we get the algorithms documented, the choice of platform is easier.

 -- Jon, KE3Z
From FORRERJ@frl.orst.edu Fri Oct 28 18:04:07 1994
Return-Path: <FORRERJ@frl.orst.edu>
Received: from amanda.bus.orst.edu by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r10L4-0001hRC; Fri, 28 Oct 94 18:04 CDT
Received: from frl.orst.edu (FRL.ORST.EDU [128.193.226.10]) by amanda.bus.orst.edu
(8.6.9/8.6.9) with SMTP id IAA02366 for <hfsig@tapr.org>; Fri, 28 Oct 1994
08:42:28 -0700
Received: from FRL/MERCURY_MAILER by frl.orst.edu (Mercury 1.11);
    Fri, 28 Oct 94 16:03:24 PST8PDT
Received: from MERCURY_MAILER by FRL (Mercury 1.11); Fri, 28 Oct 94 16:03:13
PST8PDT
From: "Johan Forrer
FL" <FORRERJ@frl.orst.edu>
Organization: Forest Research Lab. Oregon State
To: hfsig@tapr.org
Date: Fri, 28 Oct 1994 16:03:07 PST8PDT

Subject: Re: [HFSIG:67] Re: DEMODULATOR TESTING ETC.
Priority: normal
X-mailer: PMail v3.0 (R1a)
Message-ID: <65ED1C42400@frl.orst.edu>

Hi Greg,

You quite correctly pointed out the challenge of 9600 baud FSK - I do agree that what we presently have, would not have enough ticks to do that - thanks for clearing that up.

I would like you to consider some ideas on how we can achieve reasonable bit rates based on low baud rates and multiple phase / multiple amplitude modulation, i.e. complex modulation. This would be within the capabilities of what we have right now. We need however, address the variablities of the HF channel and its affects on such a scheme. I'll put out some ideas on monday on the possible use of a "pilot" channel that goes out in parallel with the data channel to aid in phase/amplitude equalization for such complex modulated schemes. This is not a unique idea either.

Oh yes, quite true - coding theory will come in a bit later in the game, but should not be a bandaid for a poor modulation, it should buy us that few extra bits "gain" on top of what we have achieved with a good modulation scheme.

73's

Johan
From k5yfw@k5yfw.ampr.org Fri Oct 28 20:56:01 1994
Return-Path: <k5yfw@k5yfw.ampr.org>
Received: from k5yfw.ampr.org by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r130c-0000q5C; Fri, 28 Oct 94 20:55 CDT
Date: Fri, 28 Oct 94 20:19:23 CST
Message-Id: <2123@k5yfw.ampr.org>
From: k5yfw@k5yfw.ampr.org (Walter D. DuBose - K5YFW)
Reply-To: k5yfw@sat.n5lyt.ampr.org
To: hfsig@tapr.org
Subject: HF Modulation
X-Mailer: Bdale's Mailer version PA3AZK.940404 (MSDOS)

Greetings HFers,

I thought I'd try and re-name this thread from DEMODULATION to Modulation. Realizing however, that both are needed and in complex modems and both creating the modulator and detector on a sound card is going to be a challange.

For those who have gotten in "late", Johan and I have been discussing robust, high speed modems for almost a year and Greg and I have been carrying on a dialog for several months now.

I have used commercial/military equipment on HF at 2400 and 4800 BPS

that were *very* robust modems. We even ran on-the-air tests against SITOR (the commercial version of AMTOR) over the same channel. The high speed modems beat SITOR in transferring data at a factor greater than the difference in bit rate. That is to say that at 2400 BPS for the robust HF modem we had 100% thruput at 2400 BPS. It was capable of 2400 BPS data transfer rate and it transfered 2400 bps. On SITOR, we had less than 100% of the possible thruput rate. In Jan of 1990, the modem cost $15,000. Today you can get it for $3,200.

I have seen the block diagram and chips it has and it "looks" like a sound card and has the same type DSP & ASP chips as soundcards. While probably would not want to just emulate that modem, we should improve on the design, we should make it a goal as we know it is achievable.

Many of my friends ask me why I hate CLOVER. I tell them that I don't but feel for that amount of money, hams should get more BPS for their buck. Hear's the reason. CLOVER uses 4 parallel tones to get 800-900 BPS. The commercial/military modems use 39 tones to get 2400 BPS with the 40th tone as an unmodulated/standard modulated pilot/doppler tone. I believe that some where between 4 and 40 tones hams (those of you who are much smarter than I) can come up with a modem for HF that will be very robust and produce 1200-2400 (and maybe more) BPS in a BW that is less than the commercial/military modem.

If the guys who will do the actual programming "max-out" the soundcard and produce a robust, 2400 BPS (100 baud or less) HF modem and can apply the the same principle to a V/UHF modem and get 9600/19.2K BPS, ham radio will have greatly benefited. If they can produce only 1200 BPS on HF and 4800 or 9600 on V/UHF, thats Ok too...just max-out the sound cards capability. By then, perhaps better sound cards and/or other devices will be on the market that will let us go higher.

I like the picture of the frog choking the water fowl while the frog's head in in the bird's mouth. The caption is never give up. Don't give up, try hard, keep it low cost and KISS.

73 & have a nice weekend ya'll.

Walt@home (dba k5yfw)
From 70730.3472@compuserve.com Sun Oct 30 23:35:41 1994
Return-Path: <70730.3472@compuserve.com>
Received: from dub-img-2.compuserve.com by dptspd.sat.datapoint.com with smtp
     (Smail3.1.28.1 #3) id m0r1pP6-0001cTC; Sun, 30 Oct 94 23:35 CST
Received: from localhost by dub-img-2.compuserve.com (8.6.4/5.940406sam)
     id AAA29239; Mon, 31 Oct 1994 00:35:29 -0500
Date: 31 Oct 94 00:33:51 EST
From: Johan Forrer <70730.3472@compuserve.com>
To: HFSIG <HFSIG@tapr.org>
Subject: Modulation
Message-ID: <941031053350_70730.3472_CHK45-1@CompuServe.COM>

Hi all,

It is not quite so obvious which "magic" technology we should pursue that will give maximum gains. Well, perhaps there is no magic answer, or at least; those that know better won't say either or won't be bothered. Lets face it, most everything that we are about to embark on, have been done before in one form or another commercially - though I am not aware of anything affordable for amateurs to experiment with (yes, Clover could have been the answer, except that it was developed as a "closed" architecture).

How one chooses one modulation/demodulation scheme over another, is an extensive and interesting topic by itself. Without going into much details, let me take an easy way out and go by what others have achieved, that is, m-FSK to approx 300 bps and (nxm)-PSK for higher rates. These have been found to be quite usable on HF.

The m-FSK option, i.e. a system similar in modulation and coding than what is presently implemented for ALE, would be quite do-able on our present DSP platforms. Anyone interested in that?

Nxm-PSK is a multitone approach. In this scheme, there are several (n- of them) independent m-PSK carriers. As far as development is concerned, one can concentrate your development efforts on getting the most out of one carrier, then add additional carriers as far as your DSP horsepower will take you, or perhaps until you run out of bandwidth (suspect the DSP is the limiting factor). The parallel deal is to be used to get maximal bit rate as conditions permit, or
serve for additional redundancy when conditions are not so good. This basically is the premise used for the MIL-STD-188 parallel modems. I would (rather bravely) like to suggest that this alternative be pursued - unless of course you could suggest a better alternative. Please let me know your opinion on this one.

Assuming the nxm-PSK approach in its simplest form, how does it sound if we develop a single m-PSK channel and see how far that takes us. ?

I would suggest as background, obtaining the following three papers (these are heavy duty, but quite good):

1) Foschini, G.J., R.D. Gitlin, and S.B. Weinstein. "On the Selection of a Two-Dimensional Signal Constellation in the Presence of Phase Jitter and Gaussian noise." Bell System Tech. Jour. Vol. 52(6) July-August 1973 pp:927-965.

2) Simon, M.K., and W.C. Lindsey. "Optimum Performance of Suppressed Carrier Receivers with Costas Loop Tracking". IEEE Trans. on Communications Vol. COM-25(2) February 1977 pp:215-227.

A more complete and realistic treatment of the performance of different modulation schemes and of phase lock loops in the presence of noise and phase jitter are also given in the above

authors' book: "Telecommunications Systems Engineering." Dover
pubs. ISBN 0-486-66838-X.

3) Simon, M.K. and J.G. Smith. "Carrier Synchronization and
Detection of QASK Signal Sets." IEEE Trans. on Communications
Vol. COM-22(2) February 1974.

It is evident, at least to me, that carrier phase synchronization and amplitude equalization becomes quite important when dealing with these complex (meaning quadrature) waveforms. The idea of using a separate "pilot" channel that carries such phasing and clock data, seems rather attractive. Not only will it simplify implementation details, but probably allow us to be able to track multipath effects. The additional robustness in system performance that it would add, would offset its small amount of additional bandwidth. Let me have your views on this one too. Also think a bit about what information need to be encoded in the "pilot" carrier.

73's

Johan

PS: Thanks to Walt for forwarding a wealth of details over an extended period on the MIL-STD-188 modems. We certainly have beaten its possibilities to death. The use of the pilot tone, or doppler channel as they call it, is used in both the 39-tone as well as the 16-tone modems.

I must also thank Bill Coleman, AA4LR, for discussions on TELEBIT's PEP, and the use of the pilot tone for dealing with multipath effects.